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Chapter 1
Introduction

Della Porta and Vanucci (1999) start their book *Corrupt Exchanges* with this remarkable comment: “Corruption is one of the most acute expressions of triumphant democracy’s unresolved problems.” (p.4). Corruption is no doubt a multidimensional phenomenon, and this statement fails to do justice to the complex nature of the problem at hand. One should also add that corruption is neither a problem specific to our age, nor to triumphant democracy for that matter.[1]

Now that we know that corruption is a widespread and endemic problem, can it be rooted out? Theoretically, this may be possible. However, in how far this route of action would be desirable is subject to debate. Rooting out corruption completely has its own trade-offs. Certainly, corruption imposes sizeable costs on society. On the other hand, fighting corruption is also costly. One of the standard tools of the economics profession, the cost and benefit analysis, might dictate that fighting corruption fails to cover the resources spent and opportunities lost along the way after a certain point, i.e. there might be declining marginal returns to scale in fighting corruption. Hence, Klitgaard (1988) argues that the optimal level of corruption is not zero (pp.24-25).

We have already started talking about corruption, but the crucial question is: What is corruption actually? How do we define it? Defining corruption precisely is a challenge. It is indeed very difficult to reach a definition that is wide enough in its coverage, abstains from value judgements, and at the same time serves analytical

[1] For a series of examples across time and space, see Bardhan (1997), Friedrich (1989) and Klitgaard (1988) for example.

purposes. The most widespread definition of corruption among economists is as follows: "Corruption is the misuse of public power for private benefit."[2]

Although it sounds rather straightforward, this definition suffers from a few shortcomings. For instance, the term "misuse" implies a deviation from the formal duties of a public position. Yet, a legal definition of this term fails to cover informal rules, the public's expectations, codes of conduct etc. Moreover, the definition assumes implicitly the presence of a clear distinction between the public and the private spheres, which need not always be the case in every single country. What is more, the concept of private benefit is not always easy to lay down clearly in the complicated cases whereby what is exchanged is not necessarily cash, but rather intangible substances such as power, status, or a future promise. However, it needs to be recognised that what is offered here is a working definition that renders a coherent analysis of corruption possible. Furthermore, this definition of corruption is endorsed by international financial institutions (IFIs) such as the World Bank and the IMF, and non-governmental organisations (NGOs) such as Transparency International.[3]

What must be clear from the definition above is that corruption is a state-society relationship. At the international level, globalisation has increased opportunities for collusive and concealed transactions between foreign private actors and host governments. Some examples are multinational companies being engaged in buying concessions, monopolies, etc.; kickbacks being offered in handing out contracts and/or loans; development aimed projects made unnecessarily expensive due to excessive spending resulting from unnecessary travels, and purchase of new computers; and numerous fringe benefits for local officials. In general, when the discretion that the public servants enjoy is considerable, and the regulations are non-transparent such that these officials can not easily be held accountable for their deeds, corruption becomes more likely. According to Andvig and Fjeldtad (2000), the problem common to all of these cases mentioned above is that corruption tends to

[2] Senturia, J A., "Corruption, Political" *Encyclopaedia of the Social Sciences*, vol. 4 (New York: Crowell-Collier-Macmillian, 1930-1935). However, similar definitions are common to most economists and policy makers.

[3] Transparency International also attempts to use a somewhat wider definition with the hope of tackling corruption among private parties. The actual wording of the definition is as follows: "Corruption is the misuse of entrusted power for private benefit". See Pope(2000). However, this definition has a drawback in that it renders the distinction between a simple case of theft from employer and that of corruption, where both the public power and private interests are involved. Consequently, the wider definition does not add much to the analytical power of the theory.

levy hidden costs on public services and blurs the distinction between the public and private spheres.

To clarify the concept of corruption, Tanzi (1995, pp.161-162) defines the arm's length principle, which dictates that personal or other relationships should play no role regarding economic decisions. His approach to defining corruption is heavily influenced by the Weberian legal-rational paradigm of public office, organised on the basis of rational procedures and universal principles, granting no room for personal motives. Corruption is, then, defined as failure to respect the distinction between public and private, or alternatively to break the arm's length principle, hence creating fertile ground for the seeds of corruption. However, this notion of public office is not immune to criticism, either. First of all, it was stated that public office is a western concept which need not find its exact equivalent in other societies. The second point regarding Weberian influenced conceptions of corruption is that legal procedures are not necessarily rational.[4]

The obvious conclusion is that a discussion of the definitions of corruption is not actually a fruitful one. Indeed, corruption is a difficult concept to define, yet an easy one to recognise. Johnston (1989, pp.92) summarises this point elegantly:

> Despite the fact that most people, most of the time, know corruption when they see it, defining the concept does raise difficult theoretical and empirical questions. We are unlikely ever to arrive at a single definition, which accurately identifies all possible cases. Moreover, if a significant proportion of the population regard a person, process, or regime as corrupt, or if they believe that corruption is inevitable in their daily lives, that is an important social and political fact, whatever an analyst might say about the situation.

For the purposes of the present study, the distinction between grand corruption and petty corruption needs to be clarified. Grand corruption, also known as political corruption, is the type of corruption observed at the highest levels of political authority. Grand corruption involves the corruptness of the decision-making segments of the society, as in cases where politicians exploit their positions for private gain, e.g., by receiving kick backs from the contracts that the state hands out, or the embezzlement of large sums from the public resources.[5]

[4] See Andvig and Fjeldstad (2000, pp.65-66).
[5] For an insightful and hands-on exposition of this topic, see Moody-Stuart (1997).

The definition of petty corruption follows straight from that of grand corruption. Also known as bureaucratic corruption, petty corruption is corruption at the public administration level, rather than at the decision-making end of politics. This is the lower level corruption that a typical citizen experiences in daily life, as in when they have to pay bribes in their encounters with public servants either to receive a service, or to escape from punishment. The difference between the two forms of corruption may not always be evident in real life situations as these could be mutually reinforcing in a pyramid of upward extraction. However, on the analytical level, the distinction lies in the fact that petty corruption is a deviation from written rules, or implicit codes of conduct, whereas the extent of grand corruption exceeds this by far. Grand corruption covers abusing, sidestepping, ignoring or tailoring laws and regulations to secure private gain.[6]

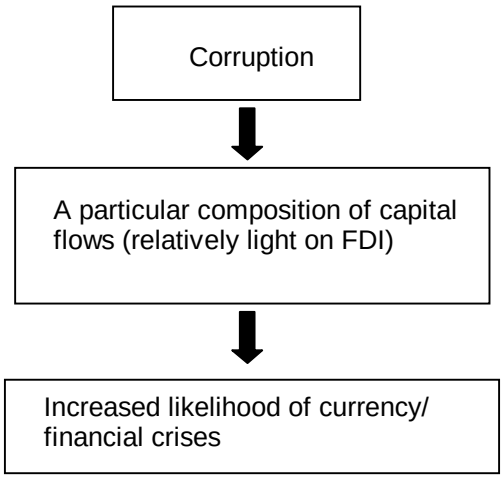
There are certainly many methodologies that could be employed to analyse corruption. Perspectives from political science, psychology, sociology and anthropology all provide important insights for analysis. The advantage of putting this topic in an economic framework enables us to take a step away from fatalistic and moralistic explanations about the phenomenon, and to treat it in a value neutral manner. Given the policy implications, it probably would not be an overstatement to say that an understanding of the economic treatment of this problem will be central to keeping a firm stand on this very slippery ground. For instance, one tends to associate corruption somehow with a lack of morals or ethics, or by the breaking of the laws in the everyday usage of the term. However, as far as the economic analysis is concerned, there are strong differences between the terms “corrupt”, “illegal”, “unethical”, and “immoral”, hence they can not be used interchangeably. That is, not all illegal transactions are corrupt and vice versa. The same argument holds for unethical and immoral transactions, too.[7] To tie up this discussion with the words of Rose-Ackerman (1999, p.xi): “Cultural differences and morality provide nuance and subtlety, but an economic approach is fundamental to understanding where corrupt incentives are the greatest and have the biggest impact.”

Chapter II of this manuscript presents a predominantly empirical analysis of the relationship between corruption and foreign direct investment (FDI). The empirical

[6] See Andvig and Fjeldstad (2000, p.19). This point also strengthens the earlier caveat about the dangers of relying only on the criteria of deviation from formal legal rules in order to define corruption.
[7] For an extended discussion on this point, see Bardhan, p.1321.

work on corruption goes back to the seminal paper of Mauro (1995), which concludes that corruption is harmful for growth, and that this channel mainly operates through its negative impact on investment.[8] There are already a number of studies on the impact of corruption on FDI (Habib and Zurawicki, 2001 and 2002; Wei and Wu, 2001; Smarzynka and Wu, 2000, etc.). By now, it can be stated that corruption has a negative impact on foreign direct inflows. To put the study into a big picture, one needs to think of the linkages in Figure 1.1.

Figure 1.1 The Link between Corruption, Capital Flows and Financial Crises



The broad argument can be summarised as follows: The presence of corruption in a country distorts the composition of capital flows against foreign direct investment, and in favour of more volatile forms of capital flows such as portfolio investments and bank loans as depicted by the first arrow in the flow chart in Figure 1.1. The argument then follows that such a volatile composition of capital flows that is relatively weak on FDI increases the likelihood of currency/financial crises, as depicted by the second arrow. This latter link is relatively well-researched (Frankel and Rose, 1996; Radelet and Sachs, 1998; Rodrik and Velasco, 1999). Hence, we turn our attention to the former link in chapter II.

The novelty of the analysis in chapter II is to take an in-depth look into the survey data on corruption in order to differentiate between different types of

[8] By virtue of being the first empirical treatment of corruption, this paper has also said the final word on the long-lasting debate on whether corruption greases the wheel (see Leff (1964) and Huntington (1968) for example), or it is sand in the wheels (see Myrdal (1968)).

corruption. Running a principal components analysis with the data on the available seven subcomponents of corruption, two principal components are retained, pertaining to the level of corruption (component 1) and to the type of corruption (component 2). This approach solves the problem of multicollinearity and allows us to distinguish between the grand and petty types of corruption. The chapter concludes that between petty and grand corruption, foreign investors are deterred more by the latter type of corruption. The chapter also offers theoretical reasoning why this might be the case and ends with policy implications.

Moving from chapter II to III, we turn our attention away from the specific field of corruption, which is but one of the manifestations of institutional failure, and focus on the institutions and growth linkages. To explain the basics of this argument, let us first start with a definition of institutions. North (1990) defines institutions as the rules of the game –both formal rules, informal rules (norms) and their enforcement characteristics. That is, institutions define how the game is played. Hence, the concept of institutions is an abstract, yet crucial one to explain the differences cross-country income levels.

Neoclassical growth theory in the vein of Solow predicts conditional convergence, i.e. conditional on initial starting point, countries are expected to converge to their steady state growth levels. However, what we observe empirically is the vast differences in per capita income levels across countries. The theory has explained the non-convergence of the poor countries to the rich ones with the differences in their total factor productivity (TFP). However, this only transformed the question to what drives the differences in TFP across nations? Solow's explanation stating that it is the technology that drives these differences, hence the total factor productivity has also been known as the Solow residual.

Chapter III sets out from the question: What determines the huge per capita income differences across nations? A strand of the literature has fruitfully brought institutions to the forefront of economic analysis (Knack and Keefer, 1995 and 1997; Hall and Jones, 1999; Acemoglu, Johnson and Robinson, 2001 and 2002). In what can be viewed as a critical contribution to the literature, these papers have used proxy measures such as security of property rights, contract enforceability etc. to measure the institutional setting of a country, and have employed these in reduced form regression analyses to investigate the hypothesis that the differences in institutional framework explain the differences in per capita income across the world,

and hence the non-convergence. In other words, this strand of literature turned Solow's argument in favour of technology on its head and offered an alternative explanation, namely that it is the institutions that matter.

However, saying that institutions matter is actually not saying much. In order to further the envelope in this field of research, we need to take a closer look into how institutions matter. Obviously, institutions are not factors of production themselves; hence they do not produce anything. Their contribution must work though the factors of production by making them more(less) productive.

In order to gain further insights into this topic, Chapter III takes Hall and Jones (1999) –one of the earliest contributions to the strand of institutions literature- as a starting point. Using the same data and econometric methodology, we augment their reduced-form regressions so as to include the factors of production, i.e. human and physical capital, and the interactions between institutions and these factors of production. The results are fascinating. First of all, inserting the factors of production into the regression, we notice that the institutions variable –although still significant- loses its magnitude drastically. Secondly, once we allow for the interaction between institutions and the factors of production, the significance of the institutions term vanishes entirely. We call this the moderating effect of institutions (as opposed to a direct effect). Finally, the chapter concludes that by doing the exercise described above, what was called the Solow residual is purged down to a typical random econometric residual.

Finally, in the fourth chapter in this manuscript, we turn our attention to the subjective measures of well-being, and present an empirical analysis of life satisfaction in transition countries. This study is somewhat more unorthodox than the previous two essays; however its roots are still grounded in an important debate in economic theory. As will be explained in chapter 4, the standard neoclassical theory has a strong objectivist touch in its methodology. In other words, it studies individuals' actions, and implicitly assumes that the actions contain all the relevant information related to the underlying preferences. Setting aside all subjective experience, this type of an approach aims to capture individuals' well-being, or utility, by inference from their observable actions. Chapter 4 explains why this is a methodologically problematic approach, and presents the alternative strand of using subjective

measures of life satisfaction. This line of research has picked up recently among economists in what is called the economics of happiness.[9]

Having recognised that the traditional utility and welfare theories have to make a lot of compromises in their assumptions to be able to present a coherent theory, the novelty of the economics of happiness research agenda is to set out by asking the individuals about their perceived life satisfaction (happiness) instead of trying to infer the same information from their consumption patterns. As such, this approach is bound to generate a complementary –perhaps even superior- information on well-being. Possibly, the most noteworthy implication of the discussion above is that although the concept of life satisfaction (happiness) is not necessarily one and the same with the concept of utility, it could be considered as a valid proxy that would yield valuable insights into the topic. By stepping out of the traditional reluctance of the economics profession to attempt to measure utility directly, economics of happiness also opens one of the fundamental areas of economic theory to empirical research.

Having clarified the links of chapter 4 with the economic theory, our aim in this chapter is to provide a systematic analysis of life satisfaction in transition countries, which has not been attempted at this breadth before. Using data from the World Values Surveys, we compare and contrast the experience regarding the correlates of life satisfaction in transition countries with that in the sample of non-transition countries. In other words, we are testing whether the stylised facts that are derived from earlier studies in economics of happiness also hold for the transition countries. Our *a priori* expectation is to find some differences, given that the transition process from command economy to market capitalism has been a devastating experience for the peoples of these countries. In fact, our findings emphasise that there are indeed several noteworthy differences in the case of the transition countries. First and foremost concerning the individual level correlates of life satisfaction, the most important difference appears to be in the field of self-employment. Accordingly, the self-employed are notably happier in the transition countries, whereas this pattern is reversed in the case of non-transition countries. This is possibly related to the new opportunities of entrepreneurship that the transition process has created.

[9] The best example for the relevance of this line of research came at the time of the writing of this dissertation in the form of an announcement that CesIfo Institute's annual Distinguished CES Fellow prize for 2005 was awarded to Bruno S. Frey, one of the leading figures in this field of research. For further references in economics of happiness, see chapter 4.

The next step in this chapter is to enrich the analysis by adding macro level variables, such as GDP per capita, inflation, unemployment rate and the Gini coefficient as a measure of inequality, to the econometric specification. Among the results that stand out is the role of inequality. Inequality seems to be particularly disliked in the post-communist societies, which appears not to be the case in the non-transition countries according to the results of our econometric model. A potential explanation for this result is the heritage of the socialist system where equality was one of the most pronounced values.

The role of reforms in the transition process is also a question of interest, especially from a practical policy point of view. This issue is tacked in the relevant section by taking a close look at the reforms as measured by the EBRD transition indicators. Finally, the paper pools the available data from earlier years of the transition period and investigates how happiness has evolved over time for a smaller sample of countries where more than two data points were available. Obviously, the period in question is too short to discern any strong trends in happiness in the sense of time series econometrics, however we were able to detect preliminary evidence in the form of a V-shaped curve, whereby the average levels of perceived happiness dipped in mid-1990s as opposed to the initial years of transition, and as the evidence from late 1990s-early 2000 suggests, they have bounced back, although very few countries report average happiness levels above the values reported in early 1990s. Finally, the chapter concludes by policy recommendations.

These three essays were written separately, yet the common theme to all of them is an emphasis on the institutional setting. The first essay does this in a narrow field of application, namely corruption. The second essay tackles a bigger question, namely the linkages between the institutional environment and growth. Finally, the common thread between these two essays and the last essay in this manuscript is the analysis of the role of reforms in the transition context and relates them to the context of happiness. After all, what better research question can one think of for an aspiring economist, whose ultimate professional goal should be to help foster happiness? On this note, we conclude this section with the words of Jeremy Bentham: “Create all the happiness you can create; remove all the misery you are able to remove.”[10]

[10] As quoted by Layard (2005, p.111).

PART I

Corruption and Foreign Direct Investment

Chapter 2
Between Two Evils:
Grand versus Petty Corruption

2.1 Introduction

It is not uncommon to hear international investors proudly mentioning how corruption functions in their countries of operations facilitating how they conduct their businesses. For instance, under the Suharto regime in Indonesia, investors would just go "top down", involving a high-ranking Suharto crony and being safe thereafter from any further corrupt requests[11]. As opposed to this, they also tend to complain that corruption in some other countries is extremely arduous and time consuming. It is this difference that this paper is about. We will recourse both to theoretical reasoning, and empirical tests using the data on FDI and corruption to investigate the validity of such arguments.

It is by now a well established empirical regularity that corruption has negative consequences for the economy. For instance, it asserts an adverse impact on the ratio of investment to GDP, (Mauro 1995 and 1997, Campos, Lien and Pradhan 1999, Brunetti, Kisunko and Weder 1997: 23 and 25; Brunetti and Weder 1998; Gymiah-Brempong 2002). There is equally strong support for the hypothesis that corruption lowers the growth rate of GDP, (Mauro 1997; Tanzi and Davoodi 2001; Leite and

[11] For detailed case studies on the organisation of grand corruption in Indonesia, see Bhargava and Bolongaita (2004).

Weidmann 1999: 24; Poirson 1998: 16; Pellegrini and Gerlagh 2004; Méon and Sekkat 2003; Gymiah-Brempong 2002). The main channel through which this happens is through lowering capital accumulation; hence it is not surprising that some studies generate insignificant results once investment is controlled for (Mauro 1995; Mo 2001). Among further areas of economic activity where corruption has a significant adverse are productivity (Lambsdorff 2003a), government services and health care, (Gupta, Davoodi and Tiongson 2001) the composition of government expenditures, (Mauro 1998 and 1997; Gupta, Davoodi and Alonso-Terme 2002; Gupta, de Mello and Sharan 2000) and tax revenues (Friedman, Johnson, Kaufmann and Zoido-Lobaton 2000; Tanzi and Davoodi 2001).

The adverse impact of corruption on foreign direct investments (FDI) is also well established. Although Alesina and Weder (1999) report an insignificant relationship, it must be taken into account that first, the authors use data prior to the 1995's considerable increase in FDI and second, they use a variable by ICRG that measures the political instability due to corruption. This variable depends not only on levels of corruption, but also on the population's intolerance towards corruption.[12] Other papers clearly support the hypothesis that corruption lowers FDI, (Wei 2000a and b, Smarzynska and Wei 2000; Wei and Wu 2001; Habib and Zurawicki 2001 and 2002). Lambsdorff (2003b) shows that overall capital inflows of a country deteriorate due to corruption.

However, the extent to which the impact of various types of corruption may differ has hardly ever been treated empirically so far. Corruption may surface under a variety of guises, such as embezzlement of public funds in public utilities, extortion of speed money in exchange for getting business permits/licences, commissions to parliamentarians to influence the content of the legislation and bribery in public contracts. It is plausible to expect that these actions are likely to have separate consequences.

The only difference in types of corruption that has been the subject of research lately relates to predictability and opportunism. The World Bank (1997: 34) argued: "There are two kinds of corruption. The first is one where you pay the regular price and you get what you want. The second is one where you pay what you have agreed

[12] Alesina and Weder (1999) also briefly state estimates using different data on corruption. Due to the brevity it is difficult to judge on the findings. The data on corruption are more recent while the FDI-data refer to 1970-1995, which may have biased the results downwards.

to pay and you go home and lie awake every night worrying whether you will get it or if somebody is going to blackmail you instead." This idea was implemented in a survey by the World Bank and the University of Basel by asking for the predictability of corruption (i.e. absence of opportunism) as well as the overall levels of corruption prevailing in a country. This survey aimed to measure not only whether the costs of corruption are known in advance, but also whether after the (corrupt) payment, the service is delivered as promised. World Bank (1997) investigates the impact of these two variables on the ratio of investment to GDP in a sample of 39 industrial and developing countries. Accordingly, for a given level of corruption, countries with more predictable and less opportunistic corruption enjoy higher investment rates. Further support for this approach is to be found in the work of Campos, Lien and Pradhan (1999), where it is concluded that the nature of corruption also matters in analysing its economic consequences. Lambsdorff (2003b: 237) confirms that besides the levels of corruption, opportunism –defined as to what extent a briber can be confident that the bribee will deliver the promised services once the payment is made- reduces a country's annual capital inflows.

But, predictability is not the only way to capture different aspects of corruption. We argue that for given levels of corruption, it is rather the petty type that has a negative impact on investment. This hypothesis will be tested by focusing on the impact of corruption on foreign direct investments (FDI), using data on corruption by the World Economic Forum, which provide a detailed breakdown of various forms of corruption. Section 2.2 provides theoretical reasoning for an impact of the level and type of corruption on FDI. Section 2.3 describes the data. Section 2.4 is the first step of the empirical investigation of how different types of corruption impact on FDI. In this section, we find that corruption in public utilities has the largest deterrent effect on FDI, whilst corruption in making laws and legislations and that in judicial decisions have the smallest magnitude of impact on FDI. We also present a principal component analysis in this section. Section 2.5 presents evidence that that the second component captures the type of corruption. Section 2.6 employs both components in regression analysis. Controlling for the first component, i.e. the level of corruption, we show how the second component also matters for FDI. This result is most likely related to the necessity of increasing organizational efforts to engage in petty corruption in public utilities and loan application, which, are more contentious areas for extortion. In contrast, engagement in grand corruption may be seen as a

voluntary decision where investors play an active role in negotiations. This means that they are in better control over the outcome. Section 2.7 presents further tests related to governance indicators and shows that the results of the analysis are robust to their inclusion. Finally, Section 2.8 interprets the results from the point of view of their policy implications, and concludes.

2.2 Theoretical Underpinnings

There are theoretical reasons to expect that international investors are deterred by corruption. Corruption has been shown to inspire cumbersome regulation, and to give incentives to public servants to create artificial bottlenecks. Red tape undoubtedly affects international investors adversely. For instance, Djankov et al. (2000: 47) shows the rates of market entry to fall with increasing levels of corruption.

Akin to a standard adverse selection problem, whereby the wrong type of individuals are selected due to informational asymmetry, e.g. as in the case of people of ill-health buying health insurance, corruption also leads to the selection of the wrong firms, that is, those that are more willing or have better capacity to offer and conceal bribes. In a setting where the advantages from “know-how” would be offset by the absence thereof with respect to “know-who”, investors would definitely be less eager to enter the new market. Furthermore, corruption brings with it the problem of enforcement, which among other things requires trust, (Lambsdorff 2002a). However, it is not necessarily easy for newcomers to instil the same levels of trust as would be readily available at the local level. Further distortions may arise if bribers have the leverage to ask public servants to harass their competitors, (Bardhan 1997: 1322). Local firms are likely to have an edge over their international competitors in arranging such impediments. Due to what may be called ‘local capture’, FDI flows would be distorted towards the home market in case of high levels of corruption. Hence, especially gross FDI inflows would suffer from corruption crowding out international investors. A priori, it is reasonable to expect net FDI inflows to be affected less by corruption because local investors may opt for seizing local (corrupt) opportunities rather than invest abroad. This hypothesis will be tested in sections 2.4 and 2.6.

Furthermore, international investors may also be cautious about the security of their property rights, which would fare low under kleptocratic rulers. Such a corrupt ruler will not be able to make a credible commitment concerning his policies, (Stiglitz 1998: 8-11; DeLong and Shleifer 1993; Rose-Ackerman 1999: 118; Grossman and

Noh 1994; Charap and Harm 2000). Once investments are sunk, they become prey to extortion. This comes about mainly because kleptocrats are neither motivated nor constrained to honour their commitments, (Ades and Di Tella 1997: 1026; Mauro 1995). Governments with a reputation for corruption find it difficult to commit to effective policies and to convince investors of their achievements. Corruption therefore deters investors because it goes along with a lacking respect for law, Lambsdorff (2003b).[13]

So far, we have discussed the potential impact of corruption in a broad perspective. It is yet to be seen, which type of corruption is more detrimental for investors. Corruption may infect a variety of different government functions, all of which may be of different relevance in the eyes of an international investor. Data on corruption in different government functions are available for 1) obtaining export and import permits, 2) getting connected to public utilities (e.g., fixed line telephony, or power grid), 3) annual tax payments, 4) awarding public contracts, 5) dealing with loan applications, 6) influencing the making of laws and policies, regulations, or decrees and 7) influencing judicial decisions. Although this list is far from exhaustive, it captures the essential areas of interface between the public and the private sector.

As will be shown subsequently, corruption in access to public utilities, tax assessments and loan application presents a rather petty type of corruption. In contrast, corruption in public contracts laws and polices and judicial decisions is of a rather grand type. Grand and petty corruption differ in their impact on investors in two major respects.

Arguments related to the organisation of corruption: Petty corruption is typically defined as the everyday, street-level type of corruption that involves small payments, speed money and tips to relatively low ranking officials. Needless to say, these payments are particularly time consuming, imposing additional costs on investors. For instance, Kaufmann and Wei (1999) document that high levels of corruption are positively associated with the time managers spend with bureaucrats in interpreting rules and regulations. This issue appears particularly relevant for petty

[13] Lambsdorff (2003b) reports that an index of law and order obtains the expected sign on a country's capital inflows. Yet, the impact of law and order on FDI was insignificant in this analysis.

corruption.[14] Extortion may also be classified as petty corruption. Public office holders may charge additional amounts over and above the official fee for providing certain services. This could be complemented by harassment or further delays unless a payment is made. It might be argued that if corruption is organised as a voluntary arrangement between a briber and a bribee, it might profit the parties involved whilst hampering the third party interests. By contrast, since extortion is beyond the control of the investors and does not entail voluntary engagement, it requires further organizational safeguards and calculations. As such, a country's reputation for extortion can easily crowd out investment. On the other hand, a reputation for collusion might be lesser of an evil for investors, as it signals credible commitment. Our argument is along the lines of Shleifer and Vishny (1993), who posit that monopolized (grand) corruption should be preferred by investors as opposed to a sequence of requests for petty bribes by decentralized units. While grand corruption would resemble a one-stop-shop, decentralized bribe takers would individually act as monopolists and thus tend to overgraze the market.

Let us take a look at the Shleifer and Vishny argument from a formal theoretical perspective. Consider the objective function of the bureaucrats as a simple profit function in the sense of revenues minus costs. The revenues come from the price they charge for the entitlements. This price should, of course, be an official and transparent fee that covers the bureaucratic costs involved in processing the application in an ideal world. This should be public knowledge and investors should be able to factor this into their cost calculations in advance. Yet, in the world that is not free of corruption, we visualise the revenue of the bureaucrat from this transaction as a percentage of the total amount invested. In other words, the bureaucrat asks t percent of the total investment in order to provide the investor with the required entitlement. She also incurs some costs in this process. The presence of these costs has nothing to do with administrative costs, but it rather stems from the necessity of obfuscating the payments, i.e. concealing the bribe. This is necessary because there is no country in the world, which does not condemn corruption as a

[14] Petty corruption might be more frequent and due to its repetitive nature might help the actors avoid opportunism, (Pechlivanos 2004). Grand corruption, on the other hand, necessitates more sophisticated designs of exchange. For example politicians are engaged in a multitude of different activities, commercial or non-commercial. By making use of this multiplicity, they can further their commercial (corrupt) interests by concealing them amid the non-commercials ones. Such a long-term engagement, or relational contracting, would make opportunism less likely, (Lambsdorff and Teksoz 2004).

criminal activity.[15] Assuming that these costs are a positive fraction of the extorted bribes, we can write the cost function as follows:

$$C = c \cdot t_i X \quad \text{where } 0<c<1$$

Hence, the profit function of the bureaucrats can be written as revenues minus costs:

$$\prod = t_i X - c t_i X = (1-c) t_i X, \tag{2.1}$$

where X is the amount invested.

Let us also assume that the amount invested is inversely proportional to the amount of the money extorted away from the investor by bureaucrats to deliver the licenses. Let A be the total amount that the investor is prepared to tie to his project. In the absence of bribes, A would be the total amount that he would have invested. Hence, the actual amount invested can be formalised as:

$$X = A(1-\sum_{i=1}^{n} t_i) \tag{2.2}$$

where n is the total number of licences required to start a new investment.

Now, we will consider two broad scenarios. The first one will be the joint profit maximisation of the n departments, which issue the licences. Imagine, for instance, the presence of a strong kleptocrat that dictates the price of the bribes to each department. The second scenario will be one where each department tries to extort the maximum amount in the form of bribes without taking into account the bribes charged by other departments. We will analyse the implications of these two scenarios in terms of the level of investment. The former scenario is that of a top-down type of corruption, and this can easily be mapped into grand type of corruption. Similarly, the latter scenario is one where there is a disorganised competition for bribes. This can be interpreted as a setting where petty corruption prevails.

Scenario 1: Grand Corruption (Joint "Profit" Maximisation of n Departments)

Inserting (2.2) into (2.1) yields the following profit function:

[15] For a discussion related to secrecy associated with corrupt payments and an in-depth look at the mechanics of concealing bribes see Lambsdorff (2002) and Lambsdorff and Teksoz (2004).

$$\prod = (1-c)t_i A(1-\sum_{i=1}^{n} t_i) \tag{2.3}$$

At this stage, we introduce symmetry in the amount of bribes. This comes about because of the presence of a central figure, e.g. a kleptocrat that sets the optimal level of bribes taking into account the joint profit maximisation nature of the problem. Hence, plugging in t_i=t in (2.3)

$$\prod = t[(1-c)A - (1-c)Ant]$$
$$\prod = (1-c)tA(1-nt)$$
$$\prod = A(1-c)(t-nt^2) \tag{2.4}$$

This is the objective function to be optimised with respect to level of bribes

$$\frac{\partial \prod}{\partial t} = A(1-c)(1-2nt) = 0 \tag{2.5}$$

Solving this optimisation problem for t (level of bribes), and calculating the resulting investment and profits leads to an optimal level of bribes in the case of grand corruption at the amount of:

$$t = \frac{1}{2n} \tag{2.6}$$

which in turn leads to investment and profit levels of:

$$X = A(1-nt) = A(1-n\frac{1}{2n}) \Rightarrow X = \frac{A}{2} \tag{2.7}$$

$$\prod = (1-c)t\frac{A}{2} = (1-c)\frac{1}{2n}\frac{A}{2} \Rightarrow \prod = (1-c)\frac{A}{4n} \tag{2.8}$$

Scenario 2: Petty Corruption (Decentralised/Disorganised "Profit" Maximisation of n Departments)

In this scenario, there is no longer a kleptocratic figure in the story, hence rather than a centralised bribe setter as in scenario 1; in this case, there will be competition for bribes. Consequently, each department behaves autonomously and maximises its objective function with the presumption that its actions has no impact on the decisions taken by other departments.

Our starting point is again the objective function defined as equation (2.3). However, a slight modification is necessary in equation (2.2) so as to reflect the change in the nature of the competition for bribes explained above. In this case:

$$\sum_{i=1}^{n} t_i = t_i + (n-1)t_j$$

in the light of which equation (2.2) could be rearranged as follows:

$$X = A(1 - t_i - (n-1)t_j) \qquad (2.2')$$

What this all means is that in the absence of a central bribe-setter, each department attempts to maximise its own bribe revenue. Therefore, it takes other n-1 departments' actions into account by including the term t_j in its calculations. However, in each department's calculation this variable is assumed to be independent of t_i and is treated as a constant.

The profit function now becomes:

$$\prod = (1-c)t_i A(1 - t_i - (n-1)t_j) \qquad (2.3')$$

The optimisation process yields the following first order condition:

$$\frac{\partial \prod}{\partial t_i} = (1-c)A[1 - 2t_i - (n-1)t_j] = 0 \qquad (2.5')$$

Given the nature of the problem, we introduce symmetry now. Hence, we plug in $t=t_i=t_j$ in equation (2.5'). This reflects the fact that the optimisation problem laid out above has been solved n times by n departments and each department arrives at the same optimal level of t.

$$\frac{\partial \prod}{\partial t_i} = (1-c)A[1 - 2t - (n-1)t] = 0$$

$$\frac{\partial \prod}{\partial t_i} = (1-c)A[1 - t(n+1)] = 0 \Rightarrow t = \frac{1}{n+1} \qquad (2.6')$$

From equation (2.6'), it follows that:

$$X = A(1-nt) = A(1-n\frac{1}{n+1}) \Rightarrow X = \frac{A}{n+1} \qquad (2.7')$$

$$\prod = (1-c)\frac{1}{(n+1)}\frac{A}{(n+1)} \Rightarrow \prod = (1-c)\frac{A}{(n+1)^2} \qquad (2.8')$$

The results can be summarised in a tabular form as follows:

Table 2.1: Equilibrium by Scenario and Numerical Illustration

	Scenario1: Grand Corruption	*Scenario 2: Petty Corruption*
Bribes: t	1/2n	1/(n+1)
Investment: X	A/2	A/(n+1)
Profit: $\prod$	(1-c)A/4n	$(1-c)A/(n+1)^2$
	Numerical Illustration: c=1/2; A=4800; n=4	
Bribes: t	1/8	1/5
Investment: X	2400	960
Profit: $\prod$	150	96

It may be argued that this exercise is an oversimplification of the actual phenomenon. However, it serves the purpose of illustrating our point in a relatively simple setting. Evidently, for all n>1, the value of the bribes is lower, moreover total investment and profits are higher in scenario 1, namely grand corruption.[16] This gives us a testable hypothesis for the empirical section of the paper: Other things being equal, foreign investors would prefer grand corruption to petty corruption in host countries, where they invest.

Fraudulent opportunities stemming from grand corruption: A cobweb of investments abroad surrounded with the secrecy of corrupt deals could also generate adverse incentives for investors to boost their own income at the expense of defrauding their firm or their shareholders. Alesina and Weder (1999) argue that corruption may even attract FDI if investors form an 'inner circle' to profit from corrupt

[16] The model presented here may also be extended by introducing n, namely the number of departments, as a choice variable, in which case there would be incentives to limit this number in the case of centralised grand corruption, and vice versa in the case of petty corruption. The insights from such an exercise are already implicit in the set up presented above.

opportunities. [17] Investment decisions, therefore, may take into account the differences in opportunities generated by grand and petty corruption. Petty corruption tends to be beyond the immediate control of decision makers, whereas the opposite holds true for grand corruption. Winston (1979: 840-1) argues that the risk associated with corruption increases with the number of transactions, the number of people involved, the duration of the transaction and the simplicity and standardization of the procedure. Since the risk does not depend on the value of a transaction, Winston argues that public servants therefore bias their decision in favour of capital intensive, technologically sophisticated and custom-built products and technologies since these generate larger kickbacks. The same logic can be applied to the case of fraudulent investors. Grand corruption provides an efficient base for such fraudulent behaviour.

Another reason for investors to be less averse to grand corruption is due to the possibility of exchanging political support in return for enforcing corrupt agreements. For example, during the tenure of former Prime Minister Benazir Bhutto, many private power companies were awarded contracts to sell power to the state Water and Power Development Authority. But the government's main anti-corruption agency maintained that kickbacks had been paid to bureaucrats and politicians in securing these deals. The new government in place initiated a wholesale renegotiation of the old contracts, cutting the electricity unit price by 30 percent. But, the International Monetary Fund and the World Bank (whose loans to private power companies would sour in case of a price cut) warned the Pakistani government that unilaterally cutting electricity unit rates would seriously lower investor's confidence. In order to exert pressure on the government, multilateral donors postponed loan agreements.

A related example comes from Indonesia, where, due to charges of corruption, the government's utility authority PLN cancelled its contracts to obtain power from large power plants built by joint ventures with large foreign companies. In this case, relatives of Suharto had been given shares of the operations, raising suspicions of kickbacks and inflated prices for electricity. But foreign delegations of export credit insurers exerted pressure on the Indonesian government to honor the old contracts. It was argued that "[t]he future investment climate will be shaped by a long-term resolution ... that protects the fundamental rights of investors. ... [Default] will impair

[17] While we acknowledge the possibility of this mechanism, we contend that it falls short of outbalancing the negative overall effect of corruption on FDI, which is empirically well established.

Indonesia and our ability to work with you in the future".[18] Such political pressure cannot be organized in the frequent cases of petty corruption, rendering them less attractive.

Corruption in public utilities and loan applications, on the other hand, often involves extortion as there is a clear official service that is demanded. Payments to officials might be made in order to avoid harassment and delay, and in some cases to avoid the official fee. Although there are exceptions to the rule, petty corruption generally necessitates time consuming negotiations over prices, and frequent confrontation with requests as well as additional organizational requirements.

Public contracts, however, are less likely to involve extortion of the type described above. In this type of activity, private firms are free to make their own calculus as to whether to pay bribes or not. Corruption in access to public utilities often happens after investors have incurred sunk costs, whereas corruption in public contracts arises *ex ante* during the tender, in other words, before investors have committed their resources. At the same time, corruption in areas such as public contracts, laws and policies and judicial decisions tends to be of the grand type. The counterparties deciding on laws, policies and public contracts tend to be higher ranking officials. Investors would be directly involved in the negotiation process and may grab the opportunities to pocket part of the payment.

In sum, two types of corruption are of relevance for our analysis: A petty type of corruption, which is cumbersome to organize, especially in fields such as public utilities and loan applications. The second sort of corruption is the grand, political type related to government policymaking and judicial decisions. The latter is much easier to organize and offers fraudulent opportunities for investors.

[18] Citation from the Far Eastern Economic Review, October 21, 1999, "Trouble on the grid." See also the Financial Times, March 10, 2000, "Interim deal in Indonesia power dispute."

2.3 Data Description

We employ two dependent variables for this study. The first is the gross FDI inflows as a percentage of GDP for the period 1995 to 2003. The annual dollar value of FDI are from the IMF International Financial Statistics, divided by the 2000 GDP in current US dollars from the World Development Indicators database. The second dependent variable is the net FDI inflows as a percentage of GDP for the period 1994 to 2002. The source for this variable is the World Development Indicators 2004.

We delete Luxembourg from the sample of countries since it is an obvious outlier. Theoretically only positive values are possible for gross FDI data. However, if FDI already calculated in previous periods are withdrawn, in some cases negative values may arise. The data on FDI are dealt with in logarithmic form. Due to some observations that are close to or below zero, we add the constant value 0.01 percent of GDP to the gross data prior to taking the logarithm. Similarly, we add one to the net FDI data before taking the logarithm.

Data on subcomponents of corruption for 102 countries in our sample comes from the World Economic Forum's (WEF) Global Competitiveness Report 2003/04. These variables are constructed as the average responses for each country (of mostly more than 50 business executives per country) from survey questions asking the respondents the following questions:

1. In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with **export and import** permits? (1 = common, 7 = never occurs)
2. In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes when getting connected to **public utilities** (e.g., telephone or electricity)? (1 = common, 7 = never occurs)
3. In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with annual **tax payments**? (1 = common, 7 = never occurs)
4. In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with **public contracts** (investment projects)? (1 = common, 7 = never occurs)
5. In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with **loan applications**?

(1 = common, 7 = never occurs)

6. In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with influencing **laws and policies**, regulations, or decrees to favour selected business interests? (1 = common, 7 = never occurs)
7. In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with getting favourable **judicial decisions**? (1 = common, 7 = never occurs)

We also use further data from the same survey for the absence of Legal Political Donations (WEF 2003; "To what extent do legal contributions to political parties have a direct influence on specific public policy outcomes? 1 = very close link between donations and policy, 7 = little direct influence on policy"), Judicial Independence (WEF 2003; "The judiciary in your country is independent from political influences of members of government, citizens, or firms: 1= No heavily influenced, 7= Yes, entirely dependent), Public Trust in Politicians (WEF 2003 "Public trust in the financial honesty of politicians is 1 = very low, 7 = very high") and the extent of bureaucratic red tape (WEF 2003 "How much time does your firm's senior management spend dealing/negotiating with government officials (as a percentage of work time)? 1 = 0%, 2 = 1–10%, 3 = 11–20%, 8 = 81–100%").

Further explanatory variables used in the study are openness (the sum of imports and exports of goods and services relative to GDP; data from the World Development Indicators, average for 1996-2002), Population (data for 2001 from the World Development Indicators), export of fuels relative to merchandise exports (World Development Indicators, average 1994-2003), growth of GDP (World Development Indicators, average 1990-1995), the share of Protestants (La Porta et al. 1999 and CIA Factbook – where the latter provided only qualitative descriptions a quantitative estimate has been provided by the authors) and distance to global investors (the sum of the distance to Chicago and that to Frankfurt. Data on latitude and longitude are from the CIA Factbook and the distances are calculated according to spherical trigonometry).

We also employ a variable concerning the grand-petty corruption distinction from the Voice of the People 2004 survey by Transparency International/Gallup. World Bank/University of Basel survey for the World Development Report 1997

provides us with a variable of opportunism in corrupt deals. Further variables of interest employed in this paper are Bureaucratic Quality, and Law and Order from the International Country Risk Guide 1998 and Absence of Civil Liberties from the Freedom in the World publication of the Freedom House. See data appendix for descriptive statistics.

2.4 Data Reduction: Principal Component Analysis

Table 2.2a and b report the results of the regressions to establish the simple link between corruption and FDI. The cross-section regressions model is specified in the following way:

$$\ln\left(FDI_i / GDP_i + 0.001\right) = \beta_0 + \beta_1 Absence\_corruption_i + \beta_2 X_i + \varepsilon_i ,$$

where i is the country subscript. X is a vector of control variables, β_i is a vector of corresponding coefficients and ε_i is a random error term. We start with a simple specification where further explanatory variables are disregarded. Accordingly, we only control for GDP per capita to capture the decreasing returns to scale in wealthy countries that drives capital transfers towards developing countries and emerging markets.

Table 2.2.a shows that the absence of corruption in public utilities has the strongest positive impact on FDI, whereas the impact of absence of corruption in law and policies and in judicial decisions is much lower. This initial reduced form evidence is in line with the theoretical arguments presented above.

It is plausible that net and gross FDI figure may exhibit differences regarding their reaction to different types of corruption. In order to do justice to this idea, we run the same regressions below this time with the dependent variable as average net FDI inflows. The results are reported in Table 2.2.b. The overall pattern is similar in that the strongest impact is from absence of corruption in public utilities to FDI, except that the magnitudes are generally smaller. Furthermore, the coefficients of absence of corruption in public contracts, in laws and policies, and in judicial decisions are not only small in magnitude in this regression, but also lose significance even at the 10% level.

Table 2.2.a Ordinary Least Squares, [a)]
Dependent Variable: Average Annual Gross FDI inflows relative to GDP, logged, 1995-2003

Independent Variables	1.	2.	3.	4.	5.	6.	7
Constant	2.94***	3.58***	3.33***	2.90***	2.85***	2.74***	2.74***
	0.55	*0.60*	*0.59*	*0.56*	*0.57*	*0.55*	*0.55*
GDP per head, log.	-0.01	-0.20*	-0.11	0.03	-0.02	0.06	0.08
	0.08	*0.10*	*0.09*	*0.08*	*0.09*	*0.07*	*0.07*
Absence of Corruption, Export and Import	0.17**						
	0.07						
Absence of Corruption, Public Utilities		0.35***					
		0.09					
Absence of Corruption, Tax Payments			0.26***				
			0.08				
Absence of Corruption, Public Contracts				0.11*			
				0.07			
Absence of Corruption, Loan Applications					0.19**		
					0.08		
Absence of Corruption, Laws and Policies						0.091	
						0.06	
Absence of Corruption, Judicial Decisions							0.04
							0.05
Obs.	95	95	95	95	95	95	95
R^2	0.09	0.19	0.15	0.07	0.09	0.06	0.05
Adj. R^2	0.07	0.17	0.13	0.05	0.07	0.04	0.03
Jarque-Bera[b)]	0.7	1.3	0.9	0.9	1.3	0.7	0.7

a) White corrected heteroskedasticity consistent standard errors in italics. Subscripts */**/*** denote 10%, 5% and 1% levels of significance, respectively.
b) The Jarque Bera statistics measures whether a series is normally distributed by taking into account its skewness and kurtosis. The assumption of a normal distribution can be rejected clearly for levels above 6.

Table 2.2.b Ordinary Least Squares, [a)]
Dependent Variable: Average Annual Net FDI inflows relative to GDP, logged, 1995-2002

Independent Variables	1.	2.	3.	4.	5.	6.	7
Constant	1.00**	1.79***	1.53**	0.92*	1.00*	0.77	0.77
	0.50	*0.51*	*0.50*	*0.53*	*0.54*	*0.50*	*0.52*
GDP per head, log.	-0.05	-0.26***	-0.18**	-0.005	-0.08	0.02	0.04
	0.07	*0.08*		*0.07*	*0.09*	*0.07*	*0.07*
Absence of Corruption, Export and Import	0.16**						
	0.07						
Absence of Corruption, Public Utilities		0.36***					
		0.08					
Absence of Corruption, Tax Payments			0.28***				
			0.07				
Absence of Corruption, Public Contracts				0.11			
				0.07			
Absence of Corruption, Loan Applications					0.21**		
					0.08		
Absence of Corruption, Laws and Policies						0.09	
						0.07	
Absence of Corruption, Judicial Decisions							0.05
							0.06
Obs.	95	95	95	95	95	95	95
R^2	0.06	0.17	0.13	0.05	0.07	0.04	0.03
Adj. R^2	0.04	0.15	0.11	0.02	0.05	0.02	0.01
Jarque-Bera[b)]	0.5	2.2	0.8	0.5	0.7	0.5	0.3

c) White corrected heteroskedasticity consistent standard errors in italics. Subscripts */**/*** denote 10%, 5% and 1% levels of significance, respectively.

d) The Jarque-Bera measures whether a series is normally distributed by considering its skewness and kurtosis. The assumption of a normal distribution can be clearly rejected for levels above 6

Inserting all data on corruption simultaneously to the regression would not yield robust results due to severe problems with multicollinearity. However, we can run a data reduction exercise by applying principal component analysis to the seven indicators to reach interpretable indices. The results are presented in Table 2.3.

Table 2.3: Total Variance Explained, Data on Corruption by the WEF 2003

	Initial Eigenvalues		
	Total	% of Variance	Cumulative %
Component 1	6.333	90.464	90.464
Component 2	0.325	4.640	95.105

Although the second component has an Eigenvalue clearly below the Kaiser criterion of 1, we believe it represents valuable information and is not just noise. First, the overall perceived level of corruption comes out quite strongly in the results mainly due to the similar phrasing of all questions. Had questions been asked for differences in types of corruption, the second component would most likely to obtain a higher Eigenvalue.[19] Second, this analysis is replicable for both 2002 or the 2004 data by the WEF, that is, the second factor derived here is qualitatively similar across these years, emphasising the robustness of the findings.

Table 2.4: Coefficient Matrix,
Data on Corruption by the WEF 2003
Extraction method: Principal Component Analysis

	Component 1	Component 2
Absence of Corruption, Export and Import	.972	.059
Absence of Corruption, Public Utilities	.930	.306
Absence of Corruption, Tax Payments	.965	.100
Absence of Corruption, Public Contracts	.958	-.146
Absence of Corruption, Loan Applications	.947	.223
Absence of Corruption, Laws and Policies	.950	-.273
Absence of Corruption, Judicial Decisions	.935	-.269

Table2.4 presents the coefficients for the two components.

The interpretation of the first component as the overall absence of corruption is a straightforward matter, especially given that all the factor loadings have the same sign. Component 2 is orthogonal to the first component and relates to the particular

[19] In this respect the Kaiser criterion is not invariant to matrix operations, such as substituting corruption in public utilities by the difference of this type of corruption to that in government programs.

type of corruption. On the one hand, corruption in public contracts, government policymaking and judicial decisions share the same negative sign for component 2. On the other hand, corruption in exports and imports, public utilities, tax payments and loan applications share a positive sign. The strongest difference in factor loadings is observed between corruption in government policymaking and corruption in public utilities.

High values of the component 2 indicate the prevalence of corruption in laws and policies, in judicial decisions and public contracts. It is plausible to think of these as forms of grand corruption. By contrast, low values of the component 2 point at the prevalence of corruption in public utilities and loan applications (and to a lesser extent in tax payments and in obtaining export and import permits). Hence lower values of this component capture petty corruption which necessitates cumbersome organizational efforts.

To illustrate how this component functions, let us think of a hypothetical situation where grand corruption is rampant and there is almost no petty corruption. The original corruption variable from the survey assigns the value 1 to cases where corruption is common and 7 to those where it never occurs. Hence, in the case of grand corruption, absence of corruption in public contracts, laws and policies and judicial decisions will all receive low values from respondents, say 1, and the rest will get high values indicating that corruption never occurs in these fields, say 7. Then, the second component will yield:

Component 2 = (.059*7)+(.306*7)+(.100*7)+(-.146*1)+(.223*7)+(-.273*1)
+ (-.269*1) =4.128

Similarly, in the opposite situation whereby petty corruption is rampant and there is no grand corruption, the same component will yield:

Component 2 = (.059*1)+(.306*1)+(.100*1)+(-.146*7)+(.223*1)+(-.273*7)
+ (-.269*7) = -4.128

In other words, the component 2 gets very high values in settings where grand corruption is high and petty corruption is low and very low values when petty corruption is high and grand corruption is low. Component 2 is, hence, best

interpreted as the relative importance of grand corruption as opposed to petty corruption. It must be said, however, that this variable is related exclusively to the relative importance of grand versus petty corruption, and disregards the levels of corruption. Hence, in the subsequent regression analysis, we will control for the absolute level of corruption with the component 1, and the relative importance of the type of corruption using component 2.

Besides making a novel interpretation of the data possible, another sizeable benefit derived from this data reduction exercise is that by imposing orthogonality condition on the components, we get rid of the multicollinearity problem, which would otherwise cast doubt on the validity of our estimates in our subsequent regressions.

2.5 Analysis of the Components

In order to better understand what these components imply, we run a series of OLS regressions in Table 2.5. Accordingly, respondents of the World Economic Forum survey perceive South America, Central America and the Caribbean and Eastern Europe including countries of the Former Soviet Union to fall prey to grand corruption. Particular examples to be mentioned here are Argentina, Bolivia, Ecuador, El Salvador, Guatemala, Nicaragua, Peru, Philippines, Slovak Republic and Venezuela. On the other hand, petty corruption is perceived to prevail in Africa. The countries with the lowest values for component 2 are Bangladesh, Cameroon, Egypt, Gambia, Ghana, Morocco, Tunisia and Zambia.

Columns 3-5 present further evidence in favour of our interpretation that component 2 is measures the type of corruption. Using further variables from the same data source, column 3 shows that component 2 decreases with public trust in politicians, with the absence of legal political donations to influence public decisions and with bureaucratic red tape. The negative sign supports our interpretation because the case of grand corruption would be associated with legal political donations, involve little trust in politicians and not depend on bureaucratic red tape.

Columns 4 and 5 are intended as further robustness checks of our interpretation of the second component using other data on types of corruption. The measure of opportunism in corrupt deals has a negative and significant impact on component 2, suggesting that grand corruption is relatively predictable.

Table 2.5. OLS, [a)]
Dependent Variable: Component 2: Type of Corruption

Independent Variables	1.	2.	3.	4.	5.
Constant	0.36***	0.30	1.21**	0.15	1.24
	0.04	*0.35*	*0.47*	*0.29*	*0.75*
GDP per head, log.		-0.006	0.04	0.10***	-0.02
		0.03	*0.03*	*0.04*	*0.09*
Dummy variable, Africa	-0.19***	-0.18*	-0.15*		
	0.06	*0.10*	*0.09*		
Dummy variable, Eastern	0.27***	0.30***	0.10		
Europe and Former Soviet	*0.08*	*0.09*	*0.08*		
Union					
Dummy variable, South	0.69***	0.70***	0.44***		
America	*0.12*	*0.12*	*0.12*		
Dummy variable, Central	0.44***	0.45***	0.20		
America and Caribbean	*0.11*	*0.12*	*0.12*		
Dummy variable,	-0.07	-0.07	-0.050		
Asia	*0.10*	*0.10*	*0.08*		
Opportunism in corrupt deals				-0.18***	-0.20**
				0.06	*0.08*
Grand – petty corruption					0.65
					0.43
Absence of Legal Political			-0.10**		
Donations, WEF 2003			*0.05*		
Public Trust in Politicians,			-0.08**		
WEF 2003			*0.04*		
Bureaucratic Red Tape,			-0.20**		
WEF 2003			*0.08*		
Obs.	101	99	99	55	31
R^2	0.51	0.52	0.64	0.11	0.17

a) White corrected heteroskedasticity consistent standard errors in italics. Subscripts */**/*** denote 10%, 5% and 1% levels of significance, respectively.

In a 2004 survey "Voice of the People", commissioned by the Transparency International, Gallup International asked questions on the types of corruption to the general public in 54 countries. Using these questions, namely "In your opinion, how would you describe the following problem facing your country: Grand or political corruption that is corruption at the highest levels of society, by leading political elites, major companies, etc?" and "Petty or administrative corruption that is corruption in ordinary people s daily lives, such as bribes paid for licenses, traffic violations, etc?" we calculate the difference between the two and interpret it as the measure of the prevalence of grand corruption over petty corruption. In the light of the caveat that the public at large may not necessarily be familiar with grand corruption in action, responses might be biased by the freedom of the media in reporting on grand

corruption. Nevertheless, this index obtains the expected sign supporting our interpretation, although it fails to reach conventional levels of significance possibly due to the restricted sample.

2.6 The Type of Corruption and FDI

Figure 2.1 presents in three-dimensional space the average gross FDI inflows relative to GDP , the overall level of corruption (component 1), and the type of corruption (component 2). As expected, when the level of corruption is low, its type is of little relevance for FDI. However, in the case of high corruption, grand corruption might be more desirable than petty corruption as it is associated with higher levels of FDI.

Figure 2.2 presents exactly the same exercise for the case of the net FDI inflows figures. The insights from this figure are also similar. In fact, the punch line from the first figure, i.e. that in high levels of corruption there is a clear tendency that grand corruption as opposed to middle and low-level corruption supports FDI, where the type loses relevance, becomes even stronger.

Figure 2.1: Average Gross FDI (IMF-Data) and Corruption

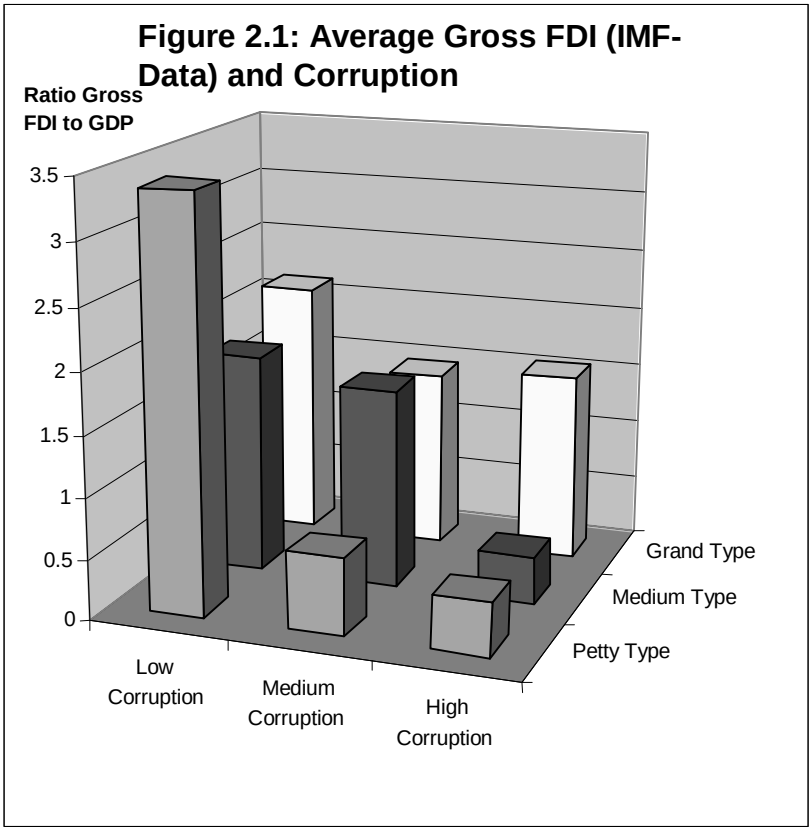
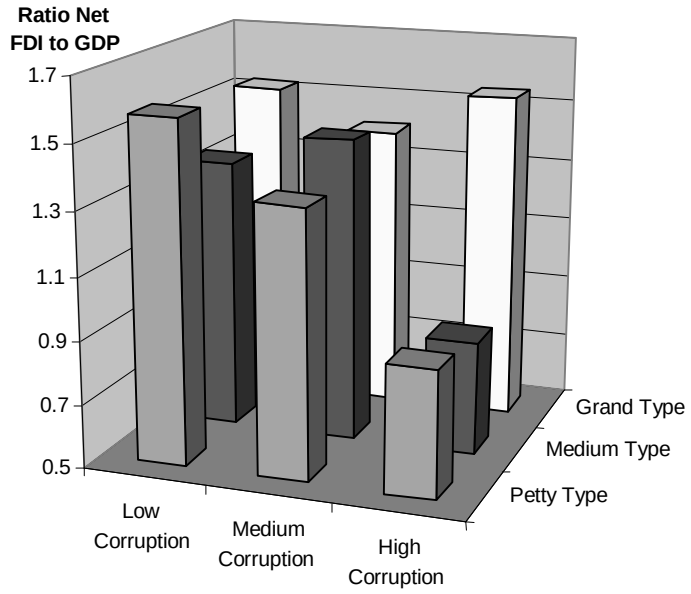


Figure 2.2: Average Net FDI (WB-Data) and Corruption



After presenting this visual evidence, we now incorporated the two components into the regressions on gross FDI in Table 2.6.a. Our strategy to set up the regressions is inspired by the approach of Habib and Zurawicki (2001 and 2002). The regressions are set up parsimoniously in order to focus on the impact of the two components on FDI. Both components are significantly, as shown in column 1. By construction, absence of corruption (component 1) ranges between 15 and 45 with a standard deviation of 7.5. Based on this column, a one-standard deviation increase in the absence of corruption increases the logarithm of the ratio of gross FDI to GDP by 0.33. In other words, it increases gross FDI by one third. Component 2 has a standard deviation of 0.4. Increasing component 2 (grand corruption as opposed to petty corruption) by one standard deviation[20], leads to a surge in the logarithm of the ratio of gross FDI to GDP by 0.3, which corresponds to an increase of roughly 35%.

These basic results remain unaffected by the inclusion of further control variables. On the basis of Mauro (1995) results indicating that corruption's impact on growth materialises through the channel of investment, we included two potential variables that emanate from growth theory, namely the domestic savings rate and the

[20] For example, by decreasing absence of corruption in public utilities by 1.3 (on a scale from 1 to 7) or by increasing absence of corruption in government programs by 1.4 (on a scale from 1 to 7).

population growth rate. Using data from the World Development Indicators, we tested, these variables, yet they were insignificant without affecting other coefficients. Hence, the results are not reported in the table. A country's level of integration to the world economy is one of the important factors to explain the FDI it receives. This can be proxied by openness, the sum of import and exports relative to GDP. This variable obtains the expected positive impact (column 2, Table 2.6.a).[21]

FDI statistics tend to be biased towards smaller countries. This is because in larger countries, sizeable investment flows take place within the borders, and as such are not recorded as FDI. For instance, investments originating from California to New York are not classified as FDI, whereas those from Portugal to Spain are. To account for this bias we control for the (logarithm of) population. This variable obtains the expected sign, yet missing conventional levels of significance, (column 3, Table 2.6.a). Given that the same result is also replicated in other specifications, we exclude this variable from subsequent regressions.

It is often argued that resource rich countries attract more FDI simply because of higher returns to investment. To proxy for this, we include a variable on the export of fuels relative to merchandise exports. Indeed, the variable is significant and carries the expected sign. In order to control for the possibility that the FDI we observe in our period of interest might be motivated by high growth rates preceding the period of investment decision, we control for the average GDP growth between 1990 and 1995. Yet, the variable is insignificant, as shown in column 3.

The location of a country is expected to play a key role in investment decisions. The distance to major markets is especially crucial if the foreign investors aim to use the host country as an export base. We expect that the more distant is a country to the USA and Western Europe, the less likely it is to attract incoming FDI. We use spherical trigonometry to calculate the distance to major markets, in our case, the distance to Chicago, USA and to Frankfurt am Main, Germany. Accordingly, the data on distance can take on a maximum value of π=3.14 for distance to one major market. Given that we are adding up the distance to Chicago and that to Frankfurt, the values are bounded to be below 2π. The highest value in this calculation was obtained by New Zealand with 5.0. Other South East Asian countries as well as

[21] Openness may capture also a certain fraction of the corruption variable, because corruption tends to reduce a country's openness. The evidence on this link is mixed, however. Ades and Di Tella (1995, 1997 and 1999) provide supportive evidence, Treisman (2000), Wei (2000a) and Knack and Azfar (2003) produce insignificant results.

Madagascar (3.7) also take on relatively high values. The lowest value, by contrast, belongs to Ireland with 1.1. Table 2.6a, column 4, shows the coefficient for distance to global investors to be around -0.2. This suggests that Ireland experiences almost twice the gross FDI inflows in comparison to a country in South East Asia, such as Indonesia.

Column 5 controls for opportunism in corrupt deals, as measured by the 1997 World Bank-University of Basel survey. Based on the earlier discussion, we expect international investors to be crowded out by opportunism, as it reduces predictability. However, contrary to our expectations, this variable obtains a positive and significant coefficient. The upshot of this is that, unlike the results of by Campos, Lien and Pradhan (1999) international investors are not concerned with opportunism in corrupt deals. Their perception of grand versus petty corruption trumps this variable with regards to the analysis of FDI decisions. This variable is excluded from subsequent regressions since data is available only for a much smaller sample.

Column 6 employs the weighted least squares technique. This is because FDI are subject to random shocks. For instance, if a small country suddenly discovers a wealth of natural resources, consequently FDI could soar well beyond its GDP. The same shock would have only a negligible impact on a large industrial country. Assuming that this type of measurement error depends on a country's size, the (logarithm) of a country's total population could be used as an appropriate weight in the regressions. The results reported earlier are once again confirmed using this specification.

Column 7 is intended as a further check on the robustness of the main findings of this study. The reason we employ the instrumental variables technique is not related to reverse causality; based on earlier literature, reverse causality, i.e. impact of FDI on levels of corruption does not seem plausible. However, we use the two-stage least squares technique in order to mitigate measurement errors. Needless to say, perceptions data on corruption also includes some noise, and as such is subject to margins of error. In this case, the instruments help avoid generating biased coefficients. Further benefits from using instruments are related to the problem of omitted variable bias. This problem would infect our results if there are some omitted variables from the regressions that are correlated with both corruption and FDI

inflows simultaneously. Again, the two-stage least squares technique addresses these issues– provided that the instruments are not correlated to omitted variables[22].

Table2.6.a Ordinary Least Squares and Weighted Least Squares, [a)] Dependent Variable: Average Annual Gross FDI inflows relative to GDP, 1995-2003

Independent Variables	1.	2.	3.	4.	5.	6. WLS	7. TSLS[b)]
Constant	3.24***	3.08***	3.59***	3.56***	4.13***	4.11***	3.56***
	0.59	*0.49*	*0.58*	*0.56*	*0.63*	*0.67*	*0.56*
GDP per head, log.	-0.14	-0.14	-0.20**	-0.20**	-0.30**	-0.33***	-0.20**
	0.10	*0.09*	*0.09*	*0.09*	*0.12*	*0.10*	*0.09*
Component 1:	0.04***	0.03***	0.04***	0.04***	0.03***	0.06***	0.04***
Absence of Corruption	*0.01*	*0.01*	*0.01*	*0.01*	*0.02*	*0.01*	*0.01*
Component 2: Grand	0.46***	0.50***	0.49***	0.49***	0.69***	0.54***	0.49***
Type of Corruption	*0.14*	*0.12*	*0.14*	*0.13*	*0.20*	*0.12*	*0.14*
Openness, % of GDP		0.07***	0.07***	0.07***	0.08***	0.07***	0.07***
		0.01	*0.01*	*0.01*	*0.01*	*0.01*	*0.00*
Population, log, 2001			0.001				
			0.04				
Export of Fuels, rel. to merchandise exports, 1994-2003			0.004*	0.004*	-0.001	0.002	0.004*
			0.002	*0.002*	*0002*	*0.001*	*0.002*
Growth of GDP, 1990-95			0.007				
			0.01				
Distance to Global Investors			-0.12**	-0.11**	-0.18***	-0.11	-0.11*
			0.06	*0.05*	*0.06*	*0.07*	*0.05*
Opportunism in corrupt deals					0.19**		
					0.08		
Obs.	95	95	94	94	54	94	94
R^2	0.18	0.45	0.50	0.50	0.59	0.94	0.49
Adj. R^2	0.15	0.43	0.45	0.46	0.52	0.93	0.46
Jarque-Bera	1.0	3.6	4.3	4.1	1.2	2.5	4.3

a) White corrected heteroskedasticity consistent standard errors in italics. Subscripts */**/*** denote 10%, 5% and 1% levels of significance, respectively.

b) Instruments used in column 7 are the share of Protestants, the extent of public trust in politicians, and absence of illegal political donations.

The share of Protestants is by now a widely accepted instrument for the level of corruption, i.e component 1. The underlying argument is that Protestantism being a less hierarchical religion, its followers are not embedded in networks that seek to maximise their individual interests at the expense of society at large, (Treisman 2000, Paldam 2001, Lambsdorff 2002b). The literature has not suggested any instruments for the type of corruption, i.e. component 2. Hence, finding valid instruments for the

[22] In order to check the validity of our instruments, we have run the Hansen-Sargan tests of overidentifying restrictions with the null hypothesis that the excluded instruments are valid instruments, meaning that they are uncorrelated with the error term and correctly excluded from the regression. We clearly fail to reject this hypothesis, suggesting that the instruments are valid.

component 2 represents a challenge. Mo (2001) suggests the use of continental dummies as instruments for corruption. Given their significant impact on component 2, as shown in Table 2.5, we have experimented using them as instruments for the type of corruption. However, we could not reject the hypothesis that they would not have a direct impact on the dependent variable. Hence, we suggest using the absence of illegal political donations and public trust in politicians as instruments instead. These variables have no effect on the dependent variable, and they are correlated with the factor 2. Given that both sets of variables are based on perceptions, it is plausible to expect that if the perceived prevalence of illegal political donations is high and the public trust in politicians is low, then perceptions of the grand type of corruption will be relatively high compared to petty corruption. Both sets of variables are expected to be measured with some imprecision. However, if the measurement errors are random, this would not constitute a problem for our estimations, In sum, the results survive instrumental variable technique assuming that an investor's reluctance when it comes to investing abroad is due to the host countries' petty type of corruption, and not to other unobserved factors.[23]

In Table 2.6.b, we repeat essentially the same exercise with the net FDI inflows data. Running the parsimonious regression in column 1, we observe that both components are again significant at 1% level of confidence. Along the lines argued above, a one-standard deviation in the first component leads to an increase of the logarithm of the ratio of net FDI inflows to GDP by 0.36. This corresponds to a 43%-increase of the net FDI inflows. Similarly, a one-standard deviation increase in the second component would increase the logged net FDI Inflows to GDP ratio by 0.19, which translates to a 21%-increase in the net FDI Inflows to GDP ratio.

The conclusions to be derived from this table are by and large similar to those from the previous one. However, there is one crucial difference in that the export of fuels variable loses much of its power when it comes to explaining the net FDI inflows. The coefficient has dropped considerably and tends to lose significance. This can be easily related to income from fuels seeking investment opportunities abroad and thus lowering the net FDI inflows.

[23] We also tested for a sample selection bias by checking whether poor countries, which tend to be underrepresented in cross-section analysis, perform differently. We observed that component 1 obtained a lower coefficient for this sample of countries while component 2 was stronger. Overall, the differences were small and did not suggest problems with sample selection.

Furthermore, the bureaucratic red tape variable, which was negative, yet not significant in Table 2.6.a is this time positive but still insignificant, leading us to strengthen our belief that it does not contain any useful information for explaining FDI flows.

Table 2.6.b Ordinary Least Squares and Weighted Least Squares, [a] Dependent Variable: Average Annual Gross FDI inflows relative to GDP, 1994-2003

Independent Variables	1.	2.	3.	4.	5.	6. WLS	7. TSLS[b]
Constant	1.48***	1.32***	1.60***	1.17	2.10***	1.96***	1.41***
	0.52	*0.43*	*0.53*	*0.95*	*0.56*	*0.61*	*0.53*
GDP per head, log.	-0.21**	-0.22***	-.25***	-0.23**	-0.33***	-0.32***	-0.25***
	0.09	*0.07*	*0.09*	*0.10*	*0.10*	*0.09*	*0.08*
Component 1:	0.05***	0.04***	0.04***	0.04***	0.03**	0.05***	0.05***
Absence of Corruption,	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*	*0.01*
Component 2: Grand,	0.47***	0.50***	0.49***	0.53***	0.63***	0.61***	0.55***
Predictable Type of Corruption,	*0.14*	*0.12*	*0.13*	*0.14*	*0.16*	*0.12*	*0.12*
Openness, % of GDP		0.01***	0.01***	0.01***	0.01***	0.01***	0.01***
		0.00	*0.00*	*0.00*	*0.00*	*0.00*	*0.00*
Population, log, 2001			-0.02				
			0.04				
Export of Fuels, rel. to			0.004*	0.004	-0.000	0.003	0.005*
merchandise exports, 1994-2003			*0.002*	*0.002*	*0.002*	*0.002*	*0.002*
Growth of GDP, 1990-95			0.01				
			0.01				
Distance to Global			-0.10	-0.09*	-0.17***	-0.17**	-0.09*
Investors			*0.05*	*0.05*	*0.06*	*0.07*	*0.05*
Bureaucratic Red				0.080			
Tape, WEF 2003				*0.16*			
Opportunism in corrupt					0.16*		
deals					*0.08*		
Obs.	95	95	90	90	51	89	83
R^2	0.16	0.40	0.52	0.52	0.65	0.62	0.53
Adj. R^2	0.13	0.37	0.47	0.47	0.59	0.59	0.49
Jarque-Bera	1.4	0.3	2.4	2.4	0.8	1.8	2.1

a) White corrected heteroskedasticity consistent standard errors in italics. Subscripts */**/*** denote 10%, 5% and 1% levels of significance, respectively.

b) Instruments used in column 7 are the share of Protestants, the extent of public trust in politicians, and absence of illegal political donations.

2.7 Robustness Checks Using Governance Indicators

Earlier research reveals that corruption goes hand in hand with low bureaucratic quality and absence of law and order, (Lambsdorff 2003a and 2003b). In order to test whether the inclusion of further governance indicators affects our findings, we use

data from the International Country Risk Guide (ICRG)[24] and from Freedom House on civil liberties. High values of ICRG and low values of civil liberties indicate favourable government conditions. Law and order variable employs a scale from 0 to 6; bureaucratic quality from 0 to 4; and Civil Liberties from 7 to 1.

Bureaucratic quality signals the presence of an administration that is autonomous from political pressure, i.e. that it uses established mechanisms for recruitment and training, and that government services are characterized by strength and expertise. If such characteristics are missing, public servants may have a free hand to create artificial bottlenecks so as to increase their corrupt income. Once corruption becomes embedded in the system, then bureaucracy will be less concerned with expertise and open to political pressures. As a result, corruption can go along with bureaucratic inefficiency.

Law and order (an index formerly called “rule of law” by ICRG) indicates that a country has sound and established political institutions, a strong judicial system and provisions for orderly succession of power. It goes without saying that the presence of corruption violates these principles. If judicial decisions and legislation are for sale, then a country cannot develop a tradition of law and order. An orderly succession of power will be substituted with a system where power can be bought. The resulting insecurity of property rights will then alienate potential investors.

Civil liberties comprise the freedom of expression and belief, personal autonomy as well as basic human and economic rights. A government that limits economic rights and civil liberties introduces distortions to the functioning of markets, inducing the search for illegal ways to circumvent regulation. This creates opportunities for corruption.

Another governance indicator considered here is judicial independence, a variable that comes from the WEF survey. Corrupt rulers are free in exploiting investors if their power is not checked by law. An independent judiciary restricts a corrupt ruler’s potential to extract bribes. It bars random changing of the laws in the books and their discretionary application. In short, the presence of an independent judiciary contributes to making political commitments credible. As a result, investors feel more confident concerning their property and form the belief that they will not be exploited after having sunk their investments.

[24] The data used are International Country Risk Guide (ICRG), May 1998, The PRS Group, East Syracuse, NY, USA.

Table 2.7.a Ordinary Least Squares, [a)]
Dependent Variable: Average Annual Gross FDI inflows relative to GDP, 1995-2003

Independent Variables	1.	2.	3.	4.	5.
Constant	3.54***	3.58***	3.92***	4.57***	3.59***
	0.60	*0.59*	*0.74*	*0.74*	*0.59*
GDP per head, log.	-0.20**	-0.24**	-0.26**	-0.27**	-0.22**
	0.09	*0.10*	*0.11*	*0.10*	*0.10*
Component 1: Absence of Corruption	0.04***	0.04***	0.04***	0.03**	0.03*
	0.01	*0.01*	*0.01*	*0.01*	*0.02*
Component 2: Grand Type of Corruption	0.52***	0.57***	0.53***	0.45***	0.64***
	0.12	0.14	0.14	0.13	0.18
Openness, % of GDP	0.01***	0.01***	0.01***	0.01***	0.01***
	0.00	*0.00*	*0.00*	*0.00*	*0.00*
Export of Fuels, rel. to merchandise exports, 1994-2003	0.005*	0.005**	0.005**	0.006**	0.005**
	0.002	*0.002*	*0.002*	*0.002*	*0.002*
Distance to Global Investors	-0.10*	-0.09*	-0.11**	-0.08*	-0.10*
	0.05	*0.05*	*0.05*	*0.05*	*0.05*
Law and Order (ICRG), 1998		0.07			
		0.06			
Bureaucratic Quality (ICRG), 1998			0.09		
			0.09		
Absence of Civil Liberties, Freedom House, 2000/2001				-0.12**	
				0.06	
Judicial Independence, WEF 2003					0.09
					0.07
Obs.	86	86	86	86	86
R^2	0.47	0.48	0.48	0.51	0.48
Adj. R^2	0.43	0.44	0.43	0.47	0.44
Jarque-Bera	3.7	3.0	3.0	1.4	3.5

a) White corrected heteroskedasticity consistent standard errors in italics. Subscripts */**/*** denote 10%, 5% and 1% levels of significance, respectively.

We proceed by adding governance variables separately to our regressions. We restrict the sample to those countries where data is available for all regressions, so as to allow for a comparison of coefficients. As usual, we start with the gross FDI data as dependent variable shown in Table 2.6a. Accordingly, law and order has no significant impact on FDI. The bureaucratic red tape variable takes on the expected sign, but misses conventional levels of significance. This suggests that international investors are not crowded out by bureaucratic red tape, nor is the negative impact of corruption related to this governance indicator. This finding is surprising, but repeats

earlier results from Lambsdorff (2003b). Bureaucratic red tape might be a relatively more arduous obstacle for small domestic firms. Large-scale foreign investors are likely to be better connected, profit from diplomatic support of their home countries and be able to engage high-ranking politicians to accelerate administrative procedures. Thus, multinational firms might substitute low bureaucratic quality with the quality of political connections, (Lambsdorff 2003b).

Civil Liberties obtain the expected sign and significance level. Reassuringly, including this variable does not alter the impact of corruption. This suggests that civil liberties are by themselves important to investors, but less so due to investors' concern about corruption. Judicial Independence is not significant, as shown in column 5. Its inclusion reduces the impact of corruption only slightly.[25] This shows that international investors are somewhat sensitive to a tradition of checks and balances. Their dislike of corruption is most likely based on fears that corrupt rulers do not honour sunk investments. These fears are aggravated when the judiciary violates the arm's length principle with the political elite. The potential explanation for this result is that such rulers face fewer restrictions to prevent extortion.

Table 2.7.b presents the same set of regressions this time with the net FDI inflows as the dependent variable. The main difference compared to Table 2.7.a, where the dependent variable is the gross FDI inflows, is that the ICRG's Law and Order index retains a positive and significant coefficient in column 2. This difference displays a further justification for investigating the behaviour of net and gross FDI inflows separately. Having said that, the impact of corruption in component 1 and 2 is not altered qualitatively even in the presence of a significant law and order variable. If anything, the magnitude of component 2, depicting the type of corruption, increases compared to column 1. Similar to the results from the previous table, bureaucratic quality and judicial independence variables obtain the expected positive sign, yet fail to attain significance in conventional levels. Furthermore, absence of civil liberties enters the regression with the expected negative and significant coefficient. All across the board, both components 1 and 2 remain significant with the expected sign, leading us to conclude for their robustness to the inclusion of further institutional variables.

[25] If we were to exclude corruption from the list of independent variables, judicial independence would become significant (regression not reported).

Table 2.7.b Ordinary Least Squares [a)]
Dependent Variable: Average Annual Net FDI inflows relative to GDP, 1994-2003

Independent Variables	1.	2.	3.	4.	5.
Constant	1.55***	1.35**	1.66**	2.65***	1.63***
	0.51	*0.53*	*0.66*	*0.57*	*0.50*
GDP per head, log.	-0.25***	-0.28***	-0.29**	-0.33***	-0.27**
	0.09	*0.09*	*0.11*	*0.08*	*0.09*
Component 1: Absence of Corruption	0.04***	0.04***	0.04**	0.04***	0.03**
	0.01	*0.02*	*0.01*	*0.01*	*0.01*
Component 2: Grand Type of Corruption	0.50***	0.61***	0.56***	0.46***	0.62***
	0.12	*0.12*	*0.13*	*0.12*	*0.15*
Openness, % of GDP	0.01***	0.01***	0.01***	0.01***	0.01***
	0.00	*0.00*	*0.00*	*0.00*	*0.00*
Export of Fuels, rel. to merchandise exports, 1994-2003	0.004*	0.005**	0.005*	0.006**	0.005**
	0.002	*0.002*	*0.002*	*0.002*	*0.002*
Distance to Global Investors	-0.09*	-0.07	-0.09	-0.07	-0.09*
	0.05	*0.05*	*0.05*	*0.05*	*0.05*
Law and Order (ICRG), 1998		0.11**			
		0.05			
Bureaucratic Quality (ICRG), 1998			0.08		
			0.09		
Absence of Civil Liberties, Freedom House, 2000/2001				-0.12**	
				0.05	
Judicial Independence, WEF 2003					0.09
					0.07
Obs.	90	82	82	90	90
R^2	0.51	0.56	0.54	0.55	0.52
Adj. R^2	0.48	0.52	0.49	0.51	0.48
Jarque-Bera	2.4	1.6	2.0	0.8	2.5

a) White corrected heteroskedasticity consistent standard errors in italics. Subscripts */**/*** denote 10%, 5% and 1% levels of significance, respectively.

These findings further our understanding of the calculus of investors. Investors prefer the grand corruption to petty corruption, but still demand restrictions on the same actors that they bribe. High ranking officials should be reasonably restricted in their legal and illegal actions. Investors want them to be limited in their ability to extort randomly from those who have already sunk their resources in investments. In this context, the presence of an independent judiciary and prevalence of civil liberties could effectively contribute to this.

Following the same line of reasoning, it can be stipulated that investors need certain safeguards to make sure that the bribe takers will actually deliver their

promises. An independent judiciary and free media could under certain conditions provide investors with a guarantee that office holders will stick to their promises after receiving a corrupt payment. Stating that an independent judiciary might contribute to the enforcement of corrupt deals might sound counterintuitive at first glance. However, the aforementioned argument should be interpreted in line with the teachings of new institutional economics, especially concerning the private arrangements to contract enforcement issues. There is no doubt that courts would reject the legal enforcement of corrupt deals. However, similar to the media, they are sometimes used as a forum to denounce the non-delivery of a corrupt service. In other words, if it is common knowledge that the courts would tend to take allegations of corruption seriously and investigate them independently, then whistleblowing tends to appear as a feasible threat to ensure the private enforcement of corrupt deals. Denunciation is likely to lead to serious reputational consequences for both parties, and more often than not to asymmetric penalties. For some case studies and a theoretical treatment of this issue see Lambsdorff (2002: 227; 237) and Lambsdorff and Teksoz (2004).

2.8 Conclusion

In line with the most recent research on the empirics of corruption, we conclude in this study that corruption deters foreign direct investment. The natural policy advice from such a result is that anti-corruption efforts must be strengthened in order to abolish the hurdles in front of foreign direct investments. However, the present study takes a step further, and investigates the impact of corruption in different fields of economic activity. Although the highly collinear nature of the data prevents us from using them simultaneously in the regressions, the strong result for public utilities emerging from Tables 2.2 a and b suggests priorities for anti-corruption. Hence, a further policy recommendation of our findings relates to public utilities: Reducing corruption in public utilities could clearly help attract international investors.

We have presented evidence that given the choice between petty and grand corruption, investors prefer the grand type of corruption, but even in that case, they demand that those politicians who take bribes should be restricted in their actions by an independent judiciary and civil liberties.

One policy recommendation can, however, not by any stretch of imagination, be derived from this paper: There is no reason to turn a blind eye to grand corruption. International investors might –as a result of economic reasoning- prefer grand corruption as the lesser of two evils because it goes along with less organizational intricacies. Yet, one cannot overemphasise that the choice is made between two evils. In other words, the results of this study apply in the context of presence of corruption. We are in fact asking the question: For given levels of corruption, what type of corruption matters most for FDI inflows? Hence, our answer applies only in this context.

Furthermore, investors might also prefer grand corruption as an opportunity for defrauding their own firm. We have no reason to believe that such fraudulent investments would also profit society. Quite to the contrary, government programs might promote useless white-elephant projects once infected by grand corruption. Empirical evidence reveals that corruption distorts public budgets away from education, and towards military spending, (Mauro 1998; Gupta, de Mello and Sharan 2000). This evidence is likely to relate to a grand type of corruption. Finally, as the saying goes, "The fish rots from the head down". The bad example set by the elite may trickle down, inducing also higher levels of petty corruption. In this sense, our results reveal that international investors do not yet contribute to sanctioning regimes characterized by grand corruption. Given the adverse welfare consequences and potential long term negative spillover effects of grand corruption, both types of corruption should be sanctioned.

Appendix

A2.1: Description of the Data Used in the Study

Variable name	Source	Definition	Descriptive statistics
Corruption in Import/Export Permits	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with **export and import** permits? (1 = common, 7 = never occurs)	Mean= 4.65 Standard deviation=1.16
Corruption in Access to Public Utilities	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes when getting connected to **public utilities** (eg, telephone or electricity)? (1 = common, 7 = never occurs)	Mean=4.98 Standard deviation=1.22
Corruption in Tax Payments	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with annual **tax payments**? (1 = common, 7 = never occurs)	Mean=4.76 Standard deviation=1.24
Corruption in Investment Contracts	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with **public contracts** (investment projects)? (1 = common, 7 = never occurs)	Mean=3.90 Standard deviation=1.18
Corruption in Loan Applications	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with **loan applications**? (1 = common, 7 = never occurs)	Mean=4.87 Standard deviation=1.07
Corruption in Legislation	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with influencing **laws and policies**, regulations, or decrees to favor selected business interests? (1 = common, 7 = never occurs)	Mean=4.15 Standard deviation=1.12
Corruption in Judiciary	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	In your industry, how commonly would you estimate that firms make undocumented extra payments or bribes connected with getting favorable **judicial decisions**? (1 = common, 7 = never)	Mean=4.15 St.Dev.=1.38

Corruption	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	Average of the seven subcomponents outlined above	Mean=4.53 Standard deviation=1.14
Component 1: Absence of Corruption	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	Retained first component after principal component analysis applied to the seven components of corruption detailed above. The first component depicts the absence of corruption	Mean=30.20 Standard deviation=7.56
Component 2: Grand Type of Corruption	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	Retained second component after principal component analysis applied to the seven components of corruption detailed above. The second component describes the type of corruption with high values related to the grand type.	Mean=0.46 Standard deviation=0.40
Grand-Petty Corruption	Gallup/Transparency International Survey, Voice of the People 2004	Difference between separate questions on perceptions of grand and petty corruption considered as (i) not a problem at all; (ii) not a particularly big problem; (iii) a fairly big problem); (iv) a very big problem. The difference is interpreted as a crude measure of the prevalence of grand over petty corruption.	Mean=0.16 Standard deviation=0.13
Opportunism in corrupt deals	World Bank/University of Basel Survey for World Development Report 1997	If a firm pays the required 'additional payment' the service is usually also delivered as agreed. 1=Always; 6=Never	Mean=3.17 Standard deviation=0.69
Net FDI Inflows	World Development Indicators	Net FDI Inflows as a percentage of GDP for the period 1994 to 2002. Notice that the dependent variable in the regressions is a logistic transformation of 1 plus this variable to avoid values around zero.	Mean=3.52 Standard deviation=2.98
Gross FDI Inflows	International Financial Statistics, International Monetary Fund	Gross FDI Inflows as a percentage of GDP for the period 1995 to 2003. Notice that the dependent variable in the regressions is a logistic transformation of 10 plus this variable to avoid values below zero.	Mean=1.59 Standard deviation=0.38
Fuel Exports	World Development Indicators	Export of fuels relative to merchandise exports, average 1994-2003	Mean=10.81 Standard deviation=20.61
Growth of GDP 1990-1995	World Development Indicators	Growth rate of GDP, average 1990-1995	Mean=2.28 Std.dev.=4.31

Openness (% of GDP)	World Development Indicators	The sum of exports and imports of goods and services relative to the GDP, average 1996-2002	Mean=80.12 Standard deviation=47.30
Population	World Development Indicators	Population, 2001, logged	Mean=2.73 Standard deviation=1.51
Absence of legal political donations	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	To what extent do legal contributions to political parties have a direct influence on specific public policy outcomes? 1= very close link between donations and policy; 7= little direct influence on policy	Mean=3.82 Standard deviation=0.85
Absence of illegal political donations	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	Prevalence of illegal political donations is 1= very low, 7= very high.	Mean=3.54 Standard deviation=1.21
Public trust in politicians	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	Public trust in the financial honesty of politicians is 1= very low, 7= very high.	Mean=2.72 Standard deviation=1.23
Bureaucratic Red Tape	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	How much time does your firm's senior management spend dealing/negotiating with government officials (as a percentage of work time)? 1=0%; 2=1-10%; 3=11-20%;[…];8= 81-100%	Mean=2.75 Standard deviation=0.46
Law and Order	International Country Risk Guide 1998	Expert assessments on law and order tradition in a country on a scale from 0 to 6 with higher values indicating more favourable conditions	Mean=4.31 Standard deviation=1.31
Bureaucratic Quality	International Country Risk Guide 1998	Expert assessments on the quality of bureaucracy in a country on a scale from 0 to 4 with higher values indicating more favourable conditions	Mean=2.49 Standard deviation=1.13
Absence of Civil Liberties	Freedom House, Freedom in the World, 2000/2001	Expert assessments of civil liberties in a country on a scale from 1 to 7 with lower values indicating more favourable conditions.	Mean=3.02 Standard deviation=1.45

Judicial Independence	World Economic Forum's (WEF) Global Competitiveness Report 2003/04	The judiciary in your country is independent from political influences of members of government, citizens or firms 1= No, heavily influenced; [..]; 7= Yes, entirely independent	Mean=3.92 Standard deviation=1.46
Distance to Global Investors	Based on latitude and longitude data from CIA Factbook	Sum of the distance to Chicago and to Frankfurt, calculated using a spherical trigonometry formula.	Mean=2.23 Standard deviation=0.99

A 2.2 Principal Components Used in the Study

	Country	WEF 2003,* Component 1: Absence of Corruption	WEF 2003,* Component 2: Type of Corruption
1	Angola	21.50	0.62
2	Argentina	22.99	1.24
3	Australia	42.79	0.34
4	Austria	40.59	0.21
5	Bangladesh	15.78	-0.46
6	Belgium	36.98	0.45
7	Bolivia	22.52	1.50
8	Botswana	35.74	0.16
9	Brazil	28.99	0.62
10	Bulgaria	33.77	0.53
11	Cameroon	20.46	-0.16
12	Canada	37.36	0.40
13	Chile	37.19	0.97
14	China,P.R.: Mainland	31.01	0.15
15	China,P.R.:Hong Kong	40.98	0.19
16	Colombia	30.72	0.99
17	Costa Rica	30.03	0.57
18	Croatia	28.24	0.56
19	Czech Republic	29.94	0.81
20	Denmark	44.79	0.16
21	Dominican Republic	25.46	0.95
22	Ecuador	24.26	1.18
23	Egypt	28.91	-0.30
24	El Salvador	34.25	1.23
25	Estonia	36.13	0.65
26	Finland	43.93	0.16
27	France	37.93	0.54
28	Gambia, The	29.76	-0.16
29	Germany	41.63	0.24
30	Ghana	25.96	-0.17
31	Greece	30.21	0.69
32	Guatemala	22.82	1.50
33	Haiti	17.70	0.50
34	Honduras	19.70	0.63
35	Hungary	34.61	0.66
36	Iceland	44.70	0.14
37	India	25.18	0.25
38	Indonesia	24.15	0.00
39	Ireland	36.89	0.72
40	Israel	40.50	0.28
41	Italy	30.70	0.70
42	Jamaica	26.70	0.41
43	Japan	36.70	0.65
44	Jordan	36.80	0.32
45	Kenya	20.83	0.43
46	Korea	33.65	0.42
47	Latvia	30.61	0.55
48	Lithuania	33.28	0.90
49	Luxembourg	40.50	0.29
50	Macedonia, FYR	22.81	0.38

* Data source: The Global Competitiveness Report 2003-2004, New York: Oxford University Press for the World Economic Forum. The values are based on a principal component analysis carried out by the author.

51	Madagascar	20.74	0.55
52	Malawi	32.43	0.23
53	Malaysia	33.36	0.31
54	Mali	18.75	0.16
55	Malta	38.12	0.50
56	Mauritius	29.83	0.42
57	Mexico	31.10	0.73
58	Morocco	24.23	-0.02
59	Mozambique	22.81	0.62
60	Namibia	29.46	0.26
61	Netherlands	40.88	0.30
62	New Zealand	44.03	0.14
63	Nicaragua	24.93	1.02
64	Nigeria	19.38	0.01
65	Norway	39.74	0.18
66	Pakistan	26.16	0.22
67	Panama	25.48	0.88
68	Paraguay	22.17	0.78
69	Peru	29.78	1.57
70	Philippines	20.98	1.15
71	Poland	28.81	0.58
72	Portugal	37.16	0.39
73	Romania	20.54	0.62
74	Russia	24.82	0.47
75	Senegal	24.14	0.36
76	Singapore	43.65	0.16
77	Slovak Republic	28.99	1.48
78	Slovenia	36.03	0.48
79	South Africa	31.65	0.17
80	Spain	37.66	0.67
81	Sri Lanka	24.33	0.20
82	Sweden	42.79	0.21
83	Switzerland	42.22	0.33
84	Tanzania	26.44	0.11
85	Thailand	32.30	0.58
86	Trinidad and Tobago	28.40	0.32
87	Tunisia	33.94	-0.07
88	Turkey	25.47	0.44
89	Uganda	20.91	0.09
90	Ukraine	23.09	0.42
91	United Kingdom	41.36	0.20
92	United States	38.42	0.45
93	Uruguay	36.60	0.47
94	Venezuela, Rep. Bol.	23.73	1.18
95	Vietnam	27.46	0.04
96	Zambia	25.39	-0.02
97	Zimbabwe	23.78	0.30

PART II

Institutions and Growth

Chapter 3
How do Institutions Lead Some Countries to Produce So Much More Output than Others?

3.1. Introduction

Development accounting exercises have established that the large per capita income differences across countries are only partially explained by variations in production inputs.[26] Of these large (up to 36 fold) differences, about half is attributed to the residual that Abramowitz termed "the economists measure of ignorance." To capture the determinants of the sizable differences in residuals in turn, a voluminous empirical literature has emphasized the role of institutions. Cross-country regressions have shown that institutions are highly correlated with income per capita; and that institutions can explain up to 30 fold per capita income differences between developed and developing countries.[27] Previous empirical approaches to estimating explanatory power of institutions for per capita income rely on reduced forms, regressing output solely on institutions. This method highlights the effect of institutions in a dramatic fashion, but sheds little light on the exact mechanics by which institutions actually affect output. Given the parsimonious set-up of the regressions, this approach may also substantially overestimate the effect of institutions on output. The purpose of this paper is to add detail to the popular reduced form estimations and examine different hypotheses regarding the exact mechanics by which institutions affect income per capita.

[26] See Caselli (2003) for a recent survey of development accounting.
[27] See Knack and Keefer (1995 and 1997), Hall and Jones (1999), Acemoglu, Johnson and Robinson (2001 and 2002), Easterly and Levine (2002).

Institutions do not physically produce output. Hence, their effect must be indirect, operating either through their impact on factor accumulation or on the level of productivity. Hall and Jones (1999) suggest that just under half of the impact of institutions on output is through its effect on factor accumulation, while the rest is due to the impact of institutions on productivity. Their econometric specification implies, however, that the effect of institutions on productivity is independent of endowments or accumulation. In other words, the elasticity of output with respect to institutions is constant across countries and unaffected by a country's level of human or physical capital.

In this paper we combine the approaches of Hall and Jones (1999, HJ henceforth) and Mankiw, Romer, and Weil (1992, MRW henceforth) in order to explain cross country per capita income levels. Specifically, we examine whether specifications in which institutions are the sole determinant of output levels (as in HJ) can be improved upon by taking into account the effect of institutions on factor productivity. Our hypothesis is that the main contribution of institutional quality to development is through its impact on the accumulation of human and physical capital.

To explore our hypothesis we introduce factors of production into HJ's specification and institutions to the MRW setup. We find that the inclusion of a measure of institutions into the MRW specification does yield a significant coefficient on institutions and reduces the residual significantly. The estimates on human capital and physical capital do not change significantly.

Augmenting HJ's specification with physical factors of production reduces the effect of institutions on output by a whole order of magnitude. Institutions retain only about 15% of their explanatory power to account for cross country income levels as compared to the HJ results. This highlights that at least some part of the contribution of institutions to output might be institution-induced increases in physical factors of production.

Next we analyze exactly how institutions affect output via factor accumulation. Both HJ and MRW, assume that the elasticities of output with respect to inputs are constant across countries. Our hypothesis suggests, however, that the quality of institutions affects factor productivities and output shares. A test of the hypothesis shows that once we allow for the factor elasticities to vary across countries, the direct

effect of institutions on output vanishes entirely and only the moderating effect of institutions prevails.

Institutions thus truly moderate the effect of human and physical capital on output. Interestingly enough, while better institutions increase the contribution of capital to output, the result is reversed for the case of human capital. Our results imply that while human capital and institutions by themselves contribute positively to output, institutions matter more for development in low human capital countries. Conversely, the better institutions are the less human capital matters in explaining differences in per capita income. These results indicate that, while physical capital and institutional quality are complements, human capital and institutions are substitutes in the development process.

Finally, we investigate the residual associated with each approach to measuring the effects of institutions on economic performance. Development accounting exercises have shown that a high correlation exists between the residual and per capita output. Due to this high correlation it seems natural to label the residual "productivity" or disembodied technology. Our results indicate, however, that by introducing institutions into the augmented Solow development accounting framework, and allowing institutions to affect the productivity of factors largely eliminates any correlation of the residual with output. This returns the residual to a true econometric residual consisting simply of white noise.

3.2. Literature Review

As mentioned above, the literature on institutions and growth is mainly built on parsimonious regressions, where income per capita is regressed on proxies for institutions. The proxies in question are based on subjective data, namely variables constructed from surveys and expert assessments.[28] The question of explaining the vast income differences between the richest and poorest countries has generated somewhat a dichotomous result. According to one strand of thought, geography is the key to explain these income differences.[29] The gist of this type of an argument is to assert that geography has a *direct* impact on productivity.

[28] Before Knack and Keefer (1995 and 1997), secure property rights/good institutions were proxied by the Gastil Index of political and civil liberties, and frequency of revolutions, coups, and political assassinations. However, results from such regressions were less than satisfactory in their explanatory power.

[29] See Sachs (2001 and 2003) for example.

At the opposite end of the spectrum is the institutions hypothesis, one of the forerunners of which is Douglass North (1990). Based on empirical evidence that poor countries are not catching up –contrary to the convergence hypothesis of neoclassical growth theory, Keefer and Knack (1995 and 1997) provided early empirical analyses concluding that institutions are powerful determinants of whether or not a country will catch up. Accordingly, there is stronger support for the conditional convergence hypothesis, once institutions are controlled for. One of the novelties of these two papers was to introduce better measures of the institutional framework countries: Variables such as contract enforceability, rule of law, risk of expropriation, coming from sources such as International Country Risk Guide (ICRG) and Business Environment Risk Intelligence (BERI) proved to be good proxies for the institutional setting.

Hall and Jones (1999) and Acemoglu, Johnson and Robinson (2001) are two studies, which perhaps made the biggest impact in terms of promoting the institutional hypothesis in the mainstream debate. HJ focuses on what they call social infrastructure, which is a hybrid between the earlier Keefer and Knack indices and the Sachs-Warner index of trade openness, whereas AJR base their analyses on the risk of expropriation.

The main issue to be addressed in this strand of the literature is certainly that of causality. Hall and Jones employ a two-stage least squares strategy using various correlates of Western European influence to instrument for the social infrastructure variable. Furthermore, their results are robust to the inclusion of geography variables (distance from the equator, and continental dummies), religious affiliation, logarithm of population, a measure of the density of economic activity, a dummy for capitalist/mixed capitalist economies and the index of ethnolinguistic fractionalization. As a result, their coefficient on the institutions variable is not affected and especially the geography variable has a small and insignificant coefficient. Their contention is that the correlation between the distance from the equator and economic performance owes much to the fact that the former was de facto acting as a proxy for the missing institutions variable.

AJR also have a sound econometric strategy to identify causality, using settler mortality rates at the beginning of the colonization period to instrument for institutions of today with the assumption that institutional change is gradual over time. Their reasoning is that wherever colonizers found suitable conditions to settle, they erected

good institutions securing property rights and the rule of law. As the argument goes, early institutions had a strong impact on the current ones, which, turn, determine current economic performance. AJR results are also robust to alternative specifications for the institutions variable, as well as controlling for geographical variables. A genius strategy as it may be as regards causality, a main drawback of their approach is that their sample size is only 64, and their instrumental variable is only available for 80 countries.

Rodrik, Subramanian and Trebbi (2002) offer a systematic horse race between possible explanations of output levels, i.e. institutions, geography and integration. Their results suggest that the impact of institutions trumps all other explanations. Once they are controlled for, geography, for instance, has at best weak and small direct effects. These results are robust to the use of different institutions variables, functional specifications, and sample sizes.

The evidence presented so far should suffice to make the point that institutions have been highlighted as the primary determinants of economic performance, measured by income/output levels. Ascertaining this much is definitely an important step, however the insights are still limited from these parsimonious approaches. There is still a lot to be done in this field, given that the literature treats institutions as black boxes so far. Understanding how institutions work to make countries more (less) productive is a crucial target. It is a modest first step towards this aim that we turn to now.

3.3. Institutions and Output Levels

3.3.1. Development Accounting in the Absence of Institutions

Most work on cross-country income differences is based on the Solow model. Following Hall and Jones (1999), let's assume output in country *i* is produced according to

$$Y_i = A_i K_i^{\alpha} H_i^{1-\alpha} \qquad (3.1)$$

where *K* denotes the stock of physical capital, *H* is the stock of efficiency units of labor, and *A* is a measure of labour-augmenting productivity. Defining all magnitudes in per capita terms, y=Y/L, k=K/L, and h=H/L, we can rewrite output per capita as

$$\log y_i = \log A_i + \alpha \log k_i - (1-\alpha) \log h_i \qquad (3.2)$$

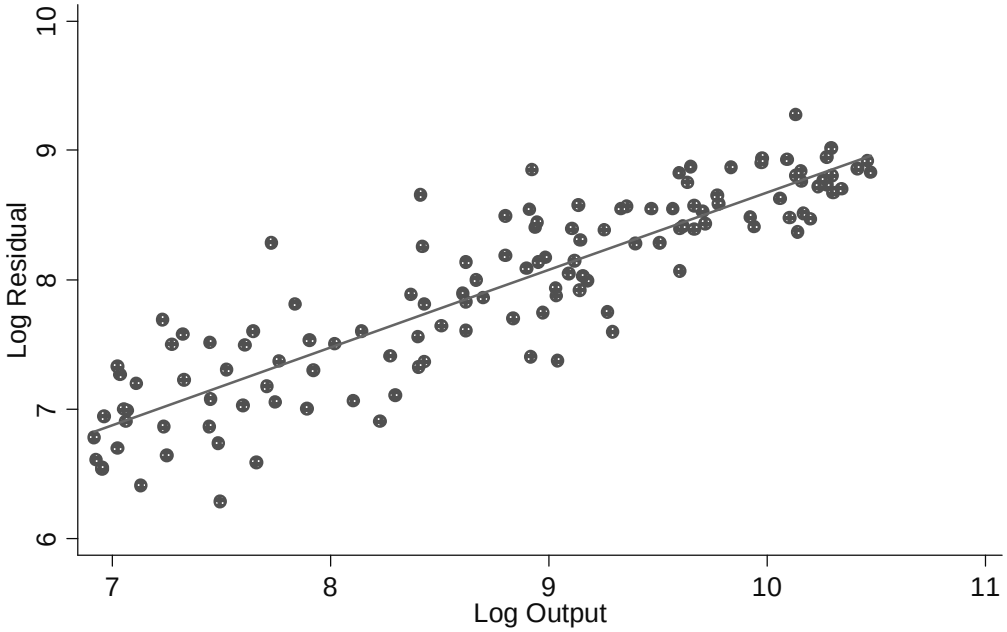
which highlights that per capita output depends on factor inputs and on the level of productivity.

HJ analyse the power of factor inputs extensively to examine if additional factors, such as institutions, are required in order to understand any remaining, unexplained, cross-country income differences. In line with most previous work, their accounting exercise assumes the elasticity of output with respect to each input to be the same for all countries, and takes it to be equal to the value of the capital share in the US, that is, $\alpha = 1/3$. HJ then replicate the well known observation that differences in inputs explain only a small fraction of cross-country differences in output. The Solow residual, obtained when we rewrite (3.2) as

$$\log A_i = \log y_i - \alpha \log k_i - (1-\alpha) \log h_i \qquad (3.3)$$

is in fact the main source of differences in per capita output across countries. Its correlation with per capita income is extremely high, as can be seen from Table 3.1, and differences in the residual explain almost 70 per cent of income differences across countries.

Figure 3.1
Output and the residual: growth accounting



3.3.2. The Role of Institutions in Development Accounting

The high correlation between the residual and per capita income has led to the interpretation that *A* is a measure of the level of technology in a country. Together with the results from the growth accounting exercise described above, this implies that richer countries are richer because the use inputs more efficiently. This answer is far from satisfactory. Inspired by the work of North (1990), HJ hypothesize that a major determinant of aggregate productive efficiency in a country is the quality of its institutions.

Hall and Jones define an institutions measure, which they call *social infrastructure*, as a weighted average of five measures of government anti-diversion and a measure of openness to international trade (see the data appendix for details on the construction of this variable). The correlation between the Solow residual and institutional quality –as measured by the HJ variable- is 0.60. Moreover, Hall and Jones maintain that institutions are in fact the fundamental determinant of a country's long-run economic performance, as they determine both productivity and factor accumulation.

They argue that the econometric specification that identifies the impact of institutions on income takes the form

$$\log y_i = \gamma_0 + \gamma_1 I_i + \varepsilon \qquad (3.4)$$

where *I* is a measure of the quality of institutions or social infrastructure, which differs across countries, and ε is a random error term. HJ estimate equation (3.3) and find that institutions can account for over 30-fold differences in per capita output.

3.3.3. Data on Institutional Quality and the Endogeneity Problem

Hall and Jones (1999) were not the first to examine the effects of institutions on economic performance. Keefer and Knack (1995 and 1997) provided early empirical analyses on the growth effects of institutions. Defining and measuring institutions is, however, not a straightforward matter, and the particular definition used may indeed influence the results. One of the novelties of the two papers by Keefer and Knack was to introduce better measures of the institutional framework countries. They suggested using subjective data, variables constructed from surveys and expert assessments such as International Country Risk Guide (ICRG) and Business

Environment Risk Intelligence (BERI).[30] Variables such as contract enforceability, rule of law, or risk of expropriation, proved to be good proxies for the institutional setting.

The two most influential studies documenting the importance of institutions in explaining cross-country income difference, Hall and Jones (1999) and Acemoglu, Johnson and Robinson (2001), have used alternative measures of institutional quality. HJ focus on a hybrid between the earlier Keefer and Knack indices and the Sachs-Warner index of trade openness, whereas Acemoglu et al. measure institutions by the risk of expropriation.

A crucial concern when seeking to assess the effect of institutions on economic performance is that a country's level of development also impacts the quality of institutions, i.e. the reverse causality problems emerge in empirical studies. Major efforts have hence been made to search for good instruments to control for endogeneity.

Hall and Jones employ various correlates of Western European influence to instrument for the social infrastructure variable. Furthermore, their results are robust to the inclusion of geography variables (distance from the equator, and continental dummies), religious affiliation, logarithm of population, a measure of the density of economic activity, a dummy for capitalist/mixed capitalist economies and the index of ethnolinguistic fractionalization. The coefficient on the institutions variable is barely affected by the use of difference instruments. Acemoglu et al. use settler mortality rates at the beginning of the colonization period to instrument for institutions of today with the assumption that institutional change is gradual over time. Their argument is that wherever colonizers found suitable conditions to settle, they created good institutions which secured property rights and the rule of law. Early institutions then determined current ones, which, turn, determine current economic performance.

The results in these papers have been confirmed by a number of subsequent studies,[31] and the overall evidence is that institutions play an overwhelming role in explaining differences in economic performance across countries. However, the insights from these parsimonious approaches are still limited. The literature has so

[30] Before Knack and Keefer (1995 and 1997), secure property rights/good institutions were proxied by the Gastil Index of political and civil liberties, and frequency of revolutions, coups, and political assassinations. However, results from such regressions were less than satisfactory in their explanatory power.

[31] See, amongst others, Kaufman et al. (1999), Easterly and Levine (2002), Grigorian and Martinez (2002) and Rodrik, Subramanian and Trebbi (2002).

far treated institutions as black boxes. Nevertheless, it is imperative to understand how institutions work to make countries more (less) productive, and how they impact upon and interact on factor accumulation. We attempt to address this question in the next section.

3.4. The Effect of Institutions versus Factor Accumulation

3.4.1 Combined Models of Institutions and Factors

The approach of HJ and Acemoglu et al. (2001) contrasts sharply with the more traditional methods used to identify the determinants of cross country per capita income, as in MRW, who regress output per capita on factor inputs. Rather than using the value of the capital share in the US to account for the contributions of the various factors, MRW estimate the elasticities of the production function econometrically. In particular, they assume that output in country *i* is produced according to

$$Y_i = AK_i^{\alpha} H_i^{\beta} L_i^{1-\alpha-\beta} \qquad (3.5)$$

where *L* denotes the number of workers, and *H* the stock of human capital. Given our definition of output per worker above and taking logs, we can re-express the above production function as

$$\log y_i = \log A + \alpha \log k_i + \beta \log h_i \qquad (3.6)$$

The MRW approach is more general than the development accounting exercise in HJ, as it does not ex ante impose an elasticity of output, nor does it assume constant returns to accumulating factors. However, the crucial assumption in MRW is that all countries are share identical productivities,[32] an assumption which does not seem to be supported by the results in HJ.

[32] In their specification of the output levels regression equation, MRW also assume that all countries are in their steady state, and write the level of output as a function of investment shares, which in turn determine the steady state levels of human and physical capital. Our formulation is more general, and simply uses factor endowments as the determinants of income levels.

Table 3.1
Institutions in the Augmented Solow Model

Dependent variable: log output per worker

	HJ	MRW	Combined model 1	Combined model 2
Institutions	5.142***		1.089***	.698**
	.343		*.235*	*.249*
Log HK		.110	.099	
(enrolment rate)		*.072*	*.069*	
HK (human capital stock)				.141
				.087
Log K		.603***	.525***	.562***
		.040	*.048*	*.037*
N	127	111	111	127
R-squared	0.58	0.91	0.92	0.91
Root MSE	0.70	.328	.31	.33
Correl (A, Y/L)	0.89	0.30	0.27	0.31
Correl (A, Institutions)	0.60	0.25	0.01	0.00

Notes: MRW specification without steady state assumptions. Specifications in columns 2 to 4 are two-stage least squares regressions, where institutions are instrumented for as in HJ 1999. Robust standard errors reported in italics. See the appendix for the first stage regression and the OLS counterparts of the regressions reported here. Subscripts ***/**/* denote 1%/5%/10% significance levels.

The first question we want to address is whether large differences in the residual remain, once we allow for the output elasticities to be determined by the data. MRW and HJ use somewhat different data, with the former using per capita income for 1985 and secondary school enrolment rates as a measure of human capital, and the latter output per worker in 1988 and the stock of human capital. In order to render comparable results, we use the HJ output data in all specifications. Human Capital data are either the original MRW or HJ, again to generate comparable results.

Table 3.1 juxtaposes the basic empirical results. The first column reports the results of HJ, where institutions alone determine output levels. The second column presents a regression of output per capita on factor inputs, a general version of MRW. In their paper[33] MRW obtain a somewhat lower elasticity of output with respect to physical capital and a higher one for human capita, 0.48 and 0.23 respectively. However, the MRW estimates are within the 10% confidence interval implied by the estimates in column 2.

[33] The coefficients we report are implied by the growth regressions in MRW, which take into account that economies may not be at their steady states.

The last two rows of Table 3.1 report the correlation of the residual with output per capita and institutions for the two approaches. In the HJ set up, this is the Solow residual obtained from equation (3), for the MRW specification, it is the residual resulting from the regression equation. The augmented Solow model provides a very good fit for the data. In particular, the correlation between the residual and output levels drops from 0.89 to 0.30, indicating that the estimates for the elasticities of output give a much better picture than imposing $\alpha = 1/3$. Nevertheless, the resulting residual is still highly correlated with institutions (0.25).

The natural extension would be to combine the two insights and estimate a production function that includes both inputs and institutions. Suppose that output is produced according to

$$Y_i = A_i K_i^{\alpha} H_i^{\beta} L_i^{1-\alpha-\beta} \qquad (3.7)$$

with the level of productivity, A_i, being a function of institutions. In particular, we stipulate that

$$A_i = A e^{\delta I_i} \qquad (3.8)$$

Output per capita is then a function of factor inputs, institutions and a residual, taken to be the level of technology, and we can express it as

$$\log y_i = \log A + \alpha \log k_i + \beta \log h_i + \delta I_i + \varepsilon \qquad (3.9)$$

The third and fourth columns in Table 3.1 report the results of the combined model (9), using the secondary school enrolment rate as used by MRW, and the stock of human capital as calculated by HJ. Following HJ, we introduce institutions into the regressions without taking logarithms.

The results from the regressions are surprisingly good. All factors have the expected sign, and the estimates are quite robust across specifications. In particular, the coefficient on institutions is positive and significant, suggesting that HJ could also have included factors of production, or that MRW could have included institutional differences to derive more accurate estimates of the contributions of physical inputs to explain per capita income differences in a cross section of countries.

Once capital and labour are included in the regression, the estimate for the effect of institutions on growth, although still positive and significant, drops by a whole order of magnitude. Institutions can now account for only between 15% and 20% of the variation in per capita incomes, in contrast to Hall and Jones. At the same

time, the inclusion of institutions shows that the elasticities of output with respect to human and physical capital barely change as compared to the basic MRW specification in column 1. These elasticities are somewhat lower in the specification with institutions.

Neither combined model represents a significant improvement over the specification of MRW in terms of theR^2. To assess the effectiveness of our specification, we examine how the combined models fare in terms of the Solow residual. The last two columns of Table 3.1 show that the inclusion of institutions has an important effect: the correlation between the residual and output falls by 10 per cent (column 3), while the correlation between the residual and institutions entirely disappears. These correlations are also depicted in Figures 3.2 and 3.3.

Figure 3.2

Output and the residual: the combined model

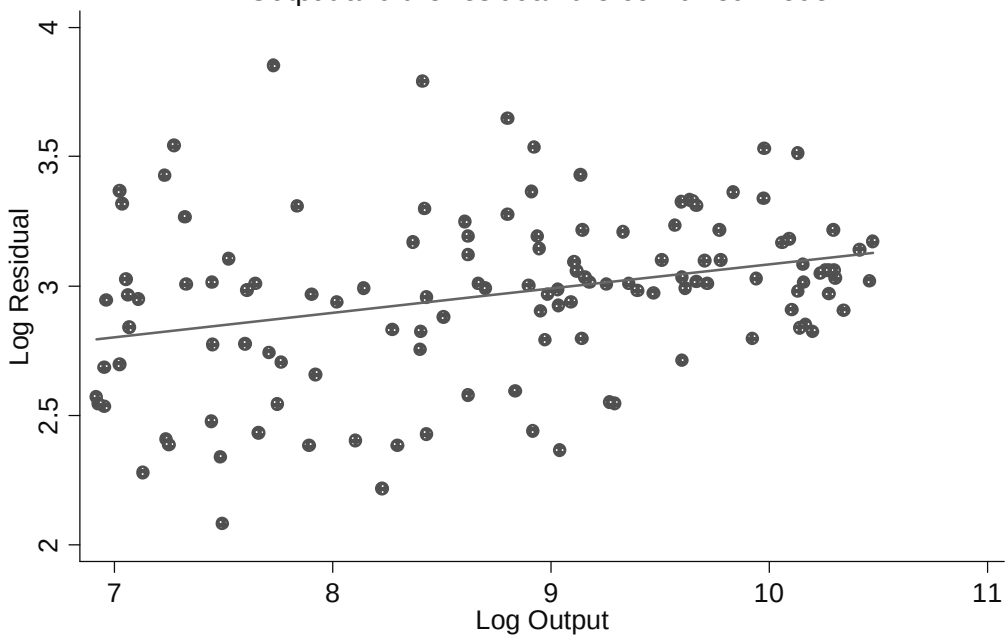
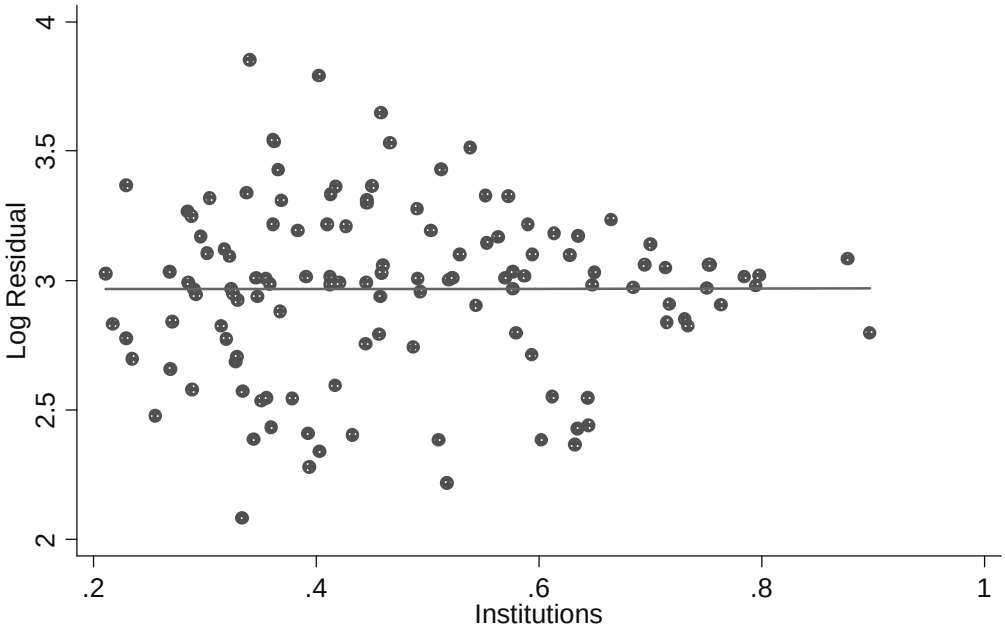


Figure 3.3
Institutions and the residual: the combined model



Our specification thus purges the residual of its institutional component, rendering it a true statistical residual due to measurement errors or violations of the structural assumptions in the Solow growth accounting framework (such as constant returns to scale).

3.4.2. The Direct and Indirect Effects of Institutions

The regressions in Table 3.1 imply that both institutions and factor accumulation matter for output levels. However, institutions by themselves do not produce anything; their effect should actually be captured by the catalytic effect institutions have on the factors of production. In this section we seek to understand how much of the variation in output is accounted for by the direct (and abstract) impact of institutions, as opposed to the indirect effect of institutions that works through factors inputs.

Table 3.2 reports the direct and indirect effects of institutions by regressing inputs on institutions. The indirect effects were obtained by running the regression $x= \gamma_0+\gamma_1 Institutions+\varepsilon$, where x is either k, h, or A. The direct effect of institutions is the coefficient δ (9), normalized such that the sum of coefficients is 5.142.

In row 1 we assess the contribution of inputs under the assumption that $\alpha = 1/3$. The contributions of inputs together with the residual, A, sum up to 5.142, which is the total contribution of institutions as measured by the coefficient in Table 3.1.

Table 3.2
Direct and Indirect Contributions of Institutions to Per Capita Income

	Dependent Variable				
	$\alpha \log \frac{K}{L}$	$\beta \log \frac{H^*}{L}$	**Log A**	**Institutions**	**Contribution of Factors****
HJ	2.416	0.896	1.830		3.312
MRW	3.478	0.767	0.897		4.245
Combined Model 1	3.745	0.325		1.072	4.070
Combined Model 2	4.222	0.196		0.724	4.418

*H refers to MRW and HJ human capital variables, respectively, logged when necessary.
** Combined contribution of human and physical capital, refers to the sum of columns 1 and 2.
Coefficients in all intermediate regressions had significance levels of over 1%.

In the HJ specification in row 1, factors of production contribute about 64% to output, whereas the contribution of the Solow residual, A, accounts for the remaining 36% of the variation in output levels across countries. That is, factor accumulation plays a limited role, accounting for less than two thirds of output differences, and institutions seem to mainly affect aggregate productivity.

The rest of the table repeats this exercise for the MRW augmented Solow model and of our combined models. The second line uses the production elasticities obtained by MRW, namely $\alpha = 0{,}48$ and ß=0.23. With these elasticities, the role of factor accumulation becomes much more important: 82 per cent of the effect of institutions occurs through human and physical capital accumulation. Similar results are obtained when we use the elasticities obtained from the combined model. Again, the main role of institutions is to encourage factor accumulation, with the direct effect accounting for between 14 and 21 per cent of the overall impact.

The other major difference between the growth accounting exercise and the results using estimated elasticities concerns the relative importance of physical and human capital accumulation. Imputing the value of α, results in a contribution of institutions through human capital which is almost a third of the total contribution of factors. This is a somewhat surprising result, especially since many of the

components of institutional quality, such as enforcement of property rights, are more likely to benefit the owners of physical than of human capital. The augmented Solow model (with or without institutions) features a much more important effect through physical capital, with only a small effect occurring through human capital accumulation (between 4 and 18 per cent of the total contribution of factors).

3.4.3. The Interaction between Institutions and Factors of Production

Our discussion above implies that physical and human capital react rather differently to improvements in institutional quality. A reason for this could be that the elasticity of output with respect to factor endowments, and hence factor returns, depend on a country's institutional quality. That is, given the level of technology, the effect of a given stock of (physical or human) capital on output depends on how good the country's institutions are.

While MRW assume the level of technology to be common across countries and allow the output elasticities to be determined by the data, HJ impute the elasticities and allow technology to vary across countries. What both approaches have in common is the assumption that *factor shares are constant across countries*. Yet, the data cast doubt on this assumption. A number of recent papers document the extensive differences in factor shares across countries and over time (see Gollin, 2002, Harrison, 2002, and Bentolila and Saint-Paul, 2003). Such evidence raises the question of whether allowing the output elasticities to vary across countries can improve our understanding of income differences. If we assume that the elasticity of output with respect to the various inputs differs systematically across countries, we must propose a mechanism by which such differences arise. Here we stipulate that institutions crucially affect the productivity of factors and their shares in output.

In order to estimate the extent to which differences in output elasticities are driven by institutional differences, we further modify the production function used by Mankiw, Romer, and Weil, and assume that output in country *i* is produced according to

$$Y_i = A_i K_i^{\alpha_i} H_i^{\beta_i} L_i^{1-\alpha_i-\beta_i} \qquad (3.10)$$

We propose that both the level of aggregate productivity and the elasticities of output with respect to the two inputs depend on the quality of institutions, *I*. As before, productivity is given by $A_i = Ae^{\delta I_i}$. Concerning the elasticities, we assume a simple

linear formulation, whereby $\alpha_i = a + \alpha I_i$ and $\beta_i = b + \beta I_i$. We can then write output per capita as

$$\log y_i = \gamma_0 + \gamma_1 I_i + \gamma_2 \log k_i + \gamma_3 I_i \log k_i + \gamma_4 \log h_i + \gamma_5 I_i \log h_i \quad (3.11)$$

with institutions affecting output through γ_1, γ_3 and γ_5, which capture both the direct effect of institutions on total factor productivity (TFP), which is constant across countries, as well as the effect of institutions on the input elasticities.

Table 3.3 reports the results of the estimation. Two surprising results emerge. Our results have two implications. First, the coefficient γ_1 is insignificant in both specifications. Institutions seem to have no effect on total factor productivity, which contrasts with the results in Table 3.1. Rather, they affect the elasticity of output with respect to inputs. The alternative interpretation is that the HJ specification loses its validity once the effect of institutions on factor inputs and factor shares has been included. The second result is no less surprising: better institutions seem to *increase* the productivity of physical capital, but *reduce* that of human capital. Institutions increase the elasticity of output with respect to physical capital and labour, and reduce the elasticity with respect to human capital. Human capital and institutions by themselves have a positive impact, however institutions matter more for growth in low human capital countries. The reverse way of thinking about this relationship is that the more human capital a country has, the less important institutions are.

Table 3.3
Institutional Effects on Labour and Capital Productivities
Dependent Variable: Output per Worker
(Two Stage Least Squares)

	Augmented model 1	**Augmented model 2**
Institutions	-.036	-1.376
	1.679	*1.705*
Log K	.438***	.367***
	.095	*.089*
Institutions*Log K	.206	.471**
	.200	*.210*
Log HK *(Enrolment rate)*	.300*	
	.161	
Institutions*Log HK	-.514	
	.396	
HK *(Human capital stock)*		.776**
		.310
Institutions*HK		-1.297**
		.517
N	111	127
R-squared	0.93	0.91
Root MSE	.31	.33
Correl (A, Y/L)	0.27	0.30
Correl (A, Institutions)	0.00	0.00

Notes: HJ and MRW specifications instrumented for institutions as in HJ 1999. Subscripts ***/**/* denote 1%/5%/10% significance levels. Robust standard errors reported in italics. OLS counterparts reported in the appendix.

Our results suggest that institutions and physical capital are complements. On the other hand, institutions and human capital are substitutes, in the sense that, given the stock of capital, a certain level of output can be produced with either a combination of good institutions and low human capital, or else with poor institutions but a highly educated labour force.

3.5. Conclusion

In this paper we examine the mechanics by which institutions may affect per capita output. The inclusion of human and physical capital reduces the power of institutions by themselves by a whole order of magnitude. In addition, our results further emphasise that institutions are not a factor of production, and do not by themselves produce output. Rather, most of their impact seems to work through the productivity of factor inputs.

The question of explaining away the Solow residual has long haunted the economics profession. Only by taking the right steps in this direction can we claim – at least- to proceed towards minimizing the measure of our ignorance. The literature on institutions and growth has so far been vastly successful in pointing its finger in the right direction. That is, to bring the institutions into the forefront of economic discussion. By now, we know that institutions matter. However, progress beyond this point has been modest. In terms of policy proposals, for instance, knowing that institutions matter suggests that improving institutions are likely to result in higher per capita income. Yet, in the absence of the knowledge of how exactly institutions affect income levels, what has been achieved so far is but to gain some modest ground against our ignorance.

Broadly stating the present research agenda as such, this paper's contribution has been to add some detail to the analysis of institutions, relying mainly on the fact that institutions are not a factor of production. Given that they do not produce anything, their effect must be through moderating factors of production. They should be setting the stage for physical and human capital to be more (less) productive. Here, we emphasize the direct versus indirect effects of institutions, and point out that most of the influence of institutions is indirect through the factors (up to 82%) dwarfing the direct effect of institutions. Our contribution in merging the HJ and MRW approaches has been to estimate the factor shares econometrically in the spirit of MRW using the set-up of HJ. Once, the estimated factor shares are taken into account, contrary to HJ, we posit that the impact of institutions functions through factor accumulation, and not through a direct effect on total factor productivity.

Despite the success of such an empirical strategy, consequent economic insights are far from complete. Institutions act on all factors of production, including technology in a mysteriously unspecified manner. The MRW approach is deeply rooted in a theory that does not speak to institutions and the HJ approach is illustrative with its exclusive focus on institutions, but lacks a theory of how institutions actually influence per capita output. In particular, neither of the two approaches addresses the issue of what exactly is the interaction between institutions and factor productivity.

We provide here a preliminary exploration of how institutions may directly affect per capita output. Our results indicate that the largest impact of institutions is through its effect on the factor productivity. While institutions have uniformly positive

effects on the productivity of physical capital, our regressions indicate that institutions and human capital are substitutes. This can be interpreted as saying that institutions matter most for countries with low levels of human capital and least for those with high levels of educational attainment.

Two main implications emerge from the present study. First, the results provide evidence for an overinvestment in human capital in some countries, raising the question of whether traditional justifications for public provision of education, based on a high social return to education, are still valid. Second, they indicate that – in contrast to the HJ approach- that improving institutions is not sufficient to generate increases in income levels. Since the main role of institutions is to increase the productivity of capital, improving institutions in countries with a very low level of investment will have only a small impact on output.

The logical next step in this research agenda would, hence, be to inquire further into the interactions between institutions and factors of production. An interesting question that deserves further research is whether the impact of institutions varies according to countries, or whether one can identify different types of institutions that have different impacts on the levels of productivity. This would also help identify further policy recommendations that go beyond saying that improvements in institutional setting will lead to productivity increases.

Finally, our analysis has been static. Yet, the results have important potential dynamic consequences, which should also not be ignored. If better institutions increase the productivity of capital, they will create investment incentives, and hence foster future output. In fact this could be a possible explanation for the strong correlation between physical capital and institutions found in the data.

Appendix

A 3.1 Description of the Data

A 3.1.1 The Institutions Variable:

For the sake of comparability between our results and those of Hall and Jones (1999), we follow their approach in defining the institutions variable. HJ call their institutions variable *Social Infrastructure*, and define it in two steps. Inspired by the earlier work of Knack and Keefer (1995), they first form an index of government anti-diversion (GADP) using the International Country Risk Guide, published by Political Risk Services covering 130 countries. The GADP index consists of the simple average of the following five categories: (i) Law and order, (ii) bureaucratic quality, (iii) corruption, (iv) risk of expropriation, and (v) government repudiation of contracts. This index is measured on a scale of 0 to 1, and assigns a higher value to better institutional quality.

The second element of the social infrastructure variable is openness to international trade. This is captured by the Sachs and Warner (1995) index, which assigns each country a score between 0 and 1 depending on the fraction of years in the period 1950-1994 a country has been open. Accordingly, a country is classified as open if it simultaneously satisfies all of the following five criteria: (i) Non-tariff barriers should be less than 40%; (ii) average tariff rates should be less than 40%; (iii) black market premium should have been less than 20% during the decade of 1970s and 1980s; (iv) the country should not be a socialist one according to the Kornai (1992) classification; (v) the government should not monopolize exports. Finally, the social infrastructure index is the unweighted average of these two components.

A 3.1.2 Output and Factors of Production:

Measurement of human capital is a very difficult undertaking, to say the least. All the proxies used in the literature so far come with their own trade-offs. For an in-depth discussion of the measurement of human capital, see Wößmann (2003). In this paper, we have been conservative in following the lead of MRW and HJ, which also has the added benefit that our results are directly comparable to the articles mentioned above. MRW use the proportion of the working-age population enrolled in secondary schools, averaged for the period 1960-1985. In order to construct their human capital proxy, they multiply the secondary school enrolment ratios by the fraction of the working population that is of the right age to attend secondary school. On the other hand, Hall and Jones (1999) use the Barro-Lee (1993) data set for human capital, which measures the average educational attainment for the population aged 25 and over for the year 1985.

Data on the basic performance measure in this study, namely the level of output per worker, was constructed by Hall and Jones on the basis of national income and labor force data from the Penn World Tables Mark 5.6, revision of Summers and Heston (1991). All data from this source refers to the year 1998. As data on hours per worker was not available for most countries, number of workers was employed as labor input in productivity calculations. Furthermore, Hall and Jones (1999) correct their GDP measure by subtracting the value added in mining industry, which includes natural resources such as oil and gas. Through this correction, they secure that the results are not driven by resource-rich countries. Physical capital stock was calculated using the perpetual inventory method.

A 3.1.3 The Instrumental Variables:

In the choice of instrumental variables, Hall and Jones (1999) rely on various measures depicting the extent of Western European influence. These measures are: Distance from the Equator, normalized to a scale of 0 to 1; the fraction of population, speaking one of the five major Western European languages, namely English, French, German, Portuguese and Spanish, as mother tongue; the fraction of population, speaking English as mother tongue; and finally the logarithm of predicted trade share of a country, based on a gravity model using the country's population and

main geographical features. The data on languages were taken from Hunter (1992) and Gunnemark (1991), whereas the trade shares variable was constructed by Frankel and Romer (1996). See Hall and Jones (1999) for a lengthy discussion of the justification of using these instruments. Although tests of overidentifying restrictions provide statistical support for the use of these instruments, we have also experimented with the log of settler mortality, suggested by Acemoglu, Johnson and Robinson (2001), which did not change the results qualitatively.

A 3.2 Descriptive Statistics and Auxiliary Regressions

Table A 3.2.1
Descriptive Statistics

	Obs.	Mean	Std. Dev.	Variance	Min	Max
logYL	134	8.81	1.07	1.14	6.92	10.48
logKL	127	9.23	1.56	2.43	5.77	11.59
Human Capital (HJ)	152	1.73	0.60	0.36	1	3.37
Enrolment Rate (MRW)	117	5.57	3.52	12.38	0.40	12.10
Social Infrastructure	130	0.47	0.25	0.06	0.11	1
Fraction of English Speakers in Population	152	0.09	0.27	0.07	0	1
Fraction of W. European Lang. Speakers in Pop.	152	0.27	0.40	0.16	0	1.064
Log Trade Shares	150	2.99	0.80	0.64	0.83	5.63
Distance from Equator	152	0.26	0.18	0.03	0	0.71

Table A 3.2.2
First Stage Regressions

Dependent Variable: Institutions (Social Infrastructure as defined by HJ)	
Distance from Equator	.708***
	.098
Log Trade Shares (Frankel and Romer)	.058**
	.023
Fraction of English Speakers in Population	.118
	.085
Fraction of W. European Lang. Speakers in Pop.	.130***
	.045
Number of Observations	127
R-Squared	0.41
Root Mean Squared Error	0.20

Table A 3.2.3
Institutions in the Augmented Solow Model (OLS)

	HJ	Enrolment rate (MRW)	Human Capital stock (HJ)
Institutions	3.289*	.732*	.697*
	.197	*.165*	*.154*
Log HK		.121***	
		.061	
HK			.104
			.080
Log K		.509*	.546*
		.042	*.035*
N	127	111	127
R-squared	0.58	0.92	0.91
Root MSE	.70	.30	.32

Notes: MRW specification without steady state assumptions. Subscripts ***/**/* denote 1%/5%/10% significance levels. Robust standard errors reported in italics.

Table A.3.2.4
Institutional Effects on Labour and Capital Productivities (OLS)

	Augmented model 1	Augmented model 2
Institutions	-1.22	-1.153
	1.12	*1.099*
Log K	.406***	.455***
	.080	*.067*
Institutions*Log K	.252*	.264**
	.132	.135
Log HK *(Enrolment rate)*	.266**	
	.127	
Institutions*Log HK	-.340	
	.231	
HK *(Human capital stock)*		.273
		.205
Institutions*HK		-.403
		.293
N	111	127
R-squared	0.93	0.91
Root MSE	.30	.33

Notes: MRW specification without steady state assumptions. Subscripts ***/**/* denote 1%/5%/10% significance levels. Robust standard errors reported in italics.

PART III

Economics of Happiness

Chapter 4
Does Transition Make You Happy?: An Ordered Probit Model of Life Satisfaction

4.1 Introduction

More than fifteen years after the fall of the Berlin wall 1989, many individuals in central and eastern Europe and the CIS are still struggling to adapt to the changes that have taken place over that period. In most transition countries, the worst is now over: the "transition recessions" of the early- and mid-1990s are past and the region as a whole[34] has been growing strongly for several years, out-performing the world economy (see EBRD, 2004). Reforms are also proceeding steadily in most countries, bringing substantial benefits in the form of higher, long-term economic growth.[35] But the problems brought by transition are far from being resolved. In many countries, these include high unemployment, widespread poverty and a severe drop in living standards for some of the more vulnerable sections of society. This paper takes a somewhat unorthodox approach to examine the effects of transition on different segments of society. Instead of "hard" data on income, unemployment, wages etc., we use a subjective, self-determined assessment of life satisfaction as the measure of an individual's welfare or utility. This is then correlated with socio-economic

[34] The region comprises of the new European Union members of central eastern Europe and the Baltic states (CEB), south-eastern Europe (SEE) and the CIS.
[35] For a review of the recent literature on the relationship between reforms and growth in transition, and a presentation of some new evidence, see Falcetti et al. (2005).

characteristics such as gender, age, income group and labour market status, as well as with macroeconomic and reform variables. The individual-level data are drawn from the *World Values Survey* (WVS), a large, multi-country survey that covers a wide range of countries around the world. This data set allows a comparison between transition and non-transition countries, highlighting the extent to which the former are different from the latter.

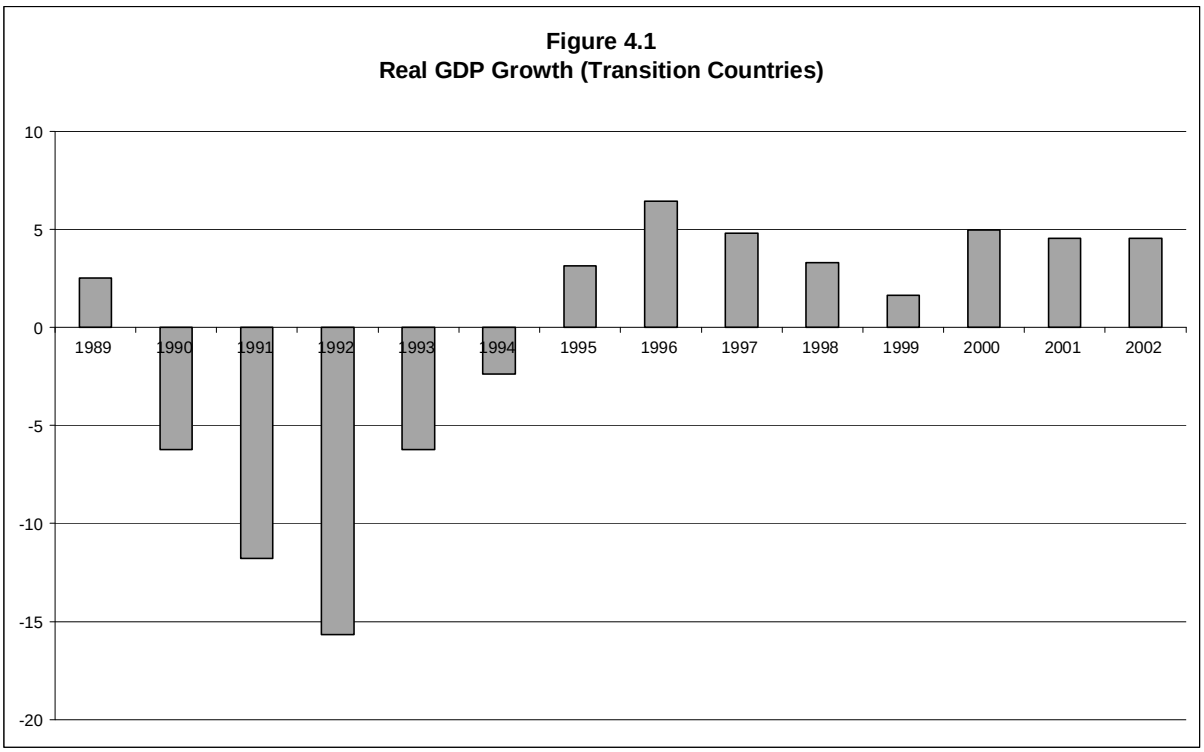
Research on the "economics of happiness" is becoming increasingly common among economists. The beginnings of this literature could be traced back to the early contributions of Easterlin (1974). However, there has been a dramatic recent increase in the volume of recent studies in this field. Clark and Oswald (1996) study workers' life satisfaction finding a strong negative association between life satisfaction and comparison income (of peers). Oswald (1997) investigates the impact of increasing economic growth on happiness of individuals. Surprisingly, increases in per capita income adds very little to individuals' happiness, whereas the being unemployment reduces it substantially. Ng (1997) and Kahnemann, Wakker and Sarin (1997) present a theoretically motivated defence for the use of the concept of experienced utility, and shows the usefulness of this concept in economic applications.

Research on economics of happiness is based on subjective data on well-being. The limitations of self-reported data on well-being and the problems with comparing answers across individuals, and across countries, are well known. But economists increasingly recognise that valuable information can be gleaned from individuals' responses to questions about their general welfare. To date, however, few papers have adopted this approach in a transition context. Grün and Klasen (2005) examine developments in a range of indicators, including subjective ones, during the transition to assess overall changes in welfare throughout the period. This type of analysis may be particularly fruitful for transition countries, where accurate objective data are often hard to find because of weaknesses in national statistical agencies and the failure to account for the large informal economy. Subjective data can, therefore, give an alternative, complementary perspective on welfare measurement in the region and the effects – both positive and negative – of transition.

This paper attempts to answer several questions. The first question is, do the socio-economic patterns in life satisfaction observed in non-transition countries also

hold in the transition region? The answer is that they do to some extent, but with important differences. In this regard, two results from the transition sample stand out. The first is that the self-employed are happier than those in full-time employment. This is consistent with the evidence of Dutz *et al*. (2004) that entrepreneurship is a high-reward strategy for the minority in transition countries who have adopted this approach. The second result of interest is that, while satisfaction shows a U-shape pattern when graphed against age (in common with other studies), the decline continues into the fifties, whereas the minimum point is usually reached much earlier in non-transition countries.

Figure 4.1
Real GDP Growth (Transition Countries)



Source: EBRD. The chart displays the average real GDP growth of the 20 transition countries covered in the empirical analysis in this paper.

As seen in Figure 4.1, after an initial dip, the real GDP growth has been fairly stable on the average in spite of the Russian Crisis of 1998. However, throughout the period, the inequality has also risen dramatically from very low initial levels.[36] The information presented here is only one facet of the transition experience. We posit that we can gain valuable supplementary insights by looking at the other side of the coin and investigating the subjective measures of happiness in transition countries to complete the picture.

[36] For a detailed analysis of inequality in the transition context and a comparison of inequality between pre- and post-transition periods, see Grün and Klasen (2001).

Hence, the second question we investigate is whether satisfaction is correlated with external macroeconomic variables such as growth and inflation. Helliwell (2002) and Oswald (2003) adopt similar approaches to ours. In the transition context, relevant questions are whether the state of reforms and the degree of inequality are important. Our results show a positive relation between reforms, as measured by the well-known EBRD transition indicators, and satisfaction. However, the size and statistical significance of this result is dependent on the specification used and the inclusion of other macroeconomic variables such as GDP per capita.

Interestingly, a high degree of inequality in transition countries is associated with lower life satisfaction. This is a fascinating result in that it is exactly reversed in the non-transition sample. People living in countries with a tradition of market capitalism tend to see inequality as less of a problem than those living in transition countries. The fact that inequality is positively associated with happiness leads one to believe that in the spirit of market capitalism, inequality brings with it economic opportunities as well. On the other hand, the emergence of exactly the opposite result in the transition sample might have to do with the heritage of communism where the values such as equality were emphasised. Given that the transition period investigated here is no longer than a decade, it is plausible that although the environment in which economic actors perform has changed drastically, their mindset has still remnants of the former system.

Finally, the paper contrasts the results from the most recent wave of the WVS with two previous waves, based on a smaller sample of transition countries. A V-shaped pattern through time is apparent in the majority of countries: that is, average life satisfaction tended to fall during the early years of transition, but returned close to the pre-transition level after about a ten-year period, and even above this level in a couple of cases.

The paper is structured as follows. Section 4.2 contains a brief overview of some of the key recent literature on the economics of happiness. Section 4.3 evaluates the subjective measures of life satisfaction and draws the link between the present paper and the economic theory. Section 4.4 describes the WVS and presents some summary tables from the latest wave. Section 4.5 presents the econometric results, based on ordered probit analysis, on the correlates of life

satisfaction. Section 4.6 extends the analysis to three different waves of the survey, and finally section 4.7 concludes the paper.

4.2 Literature Review: Happiness and Transition: What do we know?

An exciting development in social sciences in recent years is the growing interaction between economics and psychology. One of the most visible signs of this phenomenon is the dramatic increase in interest, especially among economists, in the analysis of subjective measures of well-being.[37] This literature, commonly known as the "economics of happiness", has already led to several authoritative surveys in economics journals, as well as a book by two of the leading authors in the area, Frey and Stutzer (2002a).[38] Studying the literature on economics of happiness suggests that surveys of individuals' feelings about their well-being can elicit useful information, that such responses contain supplementary information to analyse human behaviour, and that they can be compared in a broad sense of the term across individuals, countries and time. It would be naïve to state that such comparisons are necessary and sufficient conditions for an understanding of individual's well-being, however it should also be clear that by providing supplementary information on well being, the subjective data furthers substantially our understanding of the topic under investigation.

Several robust patterns have emerged from a wide number of empirical studies around the world. For example, it is generally found that happiness is positively correlated with education and income, and negatively with unemployment and ill-health. Such results are not surprising. More unexpected, perhaps, is the fact that overall well-being in industrialised economies does not appear to have increased much or at all over the past decades, despite the enormous increase in real incomes and living standards (see Blanchflower and Oswald, 2004; Layard, 2005; Easterlin,

[37] The issue has also attracted considerable media interest recently. See, for example, the special edition of *Time* magazine entitled "The Science of Happiness", January 17, 2005, and an article by Larry Elliott entitled "Happiness may be in the mind but the state still has a role to play" in *The Guardian*, February 28, 2005.

[38] Other recent surveys include Oswald (1997), Frey and Stutzer (2002b), and Layard (2005). There is extensive literature on the subject in psychology journals; Diener and Seligman (2004) is a useful overview. Other inter-disciplinary initiatives worth noting in this area include an internet site on happiness research, organised and managed by the sociologist Ruut Veenhoven (http://www2.eur.nl/fsw/research/happiness/), and a journal called the *Journal of Happiness Studies*.

1995). This apparent puzzle is generally explained by adaptation theories, namely, that people become used to new circumstances and adjust their notions of well-being accordingly, and by the fact that people are often more concerned with their *relative* status (compared to those around them) rather than with some absolute measure of income or consumption. These are highly relevant considerations when analysing transition economies, where the upheavals have been huge and adaptation is likely to take some time, and where people may have inherited a strong aversion to inequality, (Grün and Klasen, 2001).

We make no attempt here to survey the broad literature; instead we concentrate on those papers devoted wholly or in part to analysing happiness in transition economies. This literature is rather sparse. Frey and Stutzer (2002b) note that "there is still a lack of data on subjective well-being in developing and transition countries" (p. 431). Graham (2004) makes the same point, noting that when such studies exist, they tend to focus on individual countries only. This is an important gap that needs to be filled, as there are at least two reasons why this type of analysis is particularly relevant for the region.

First, the transition process has involved a major upheaval for most people, and therefore one would expect to see this reflected in happiness scores, particularly in the early years of transition. Similarly, measures of happiness would be expected to increase over time as circumstances have improved and people have become used to the new regime. These hypotheses can be tested if one has access to subjective data on transition countries at different stages of transition.

Second, objective, reliable data in transition economies are often hard to find. In most countries of the region, there is a large informal economy and statistical coverage of the newly emerging private sector is sometimes patchy. Subjective measures of well-being can, therefore, provide a useful complement to conventional economic data, and can help identify those groups or regions most affected by transition.

One fact emerges clearly from cross-country surveys of subjective well-being: transition economies consistently appear at or near the bottom of the list. In Veenhoven's world database of happiness, there is a summary table on average happiness in 68 nations during the 1990s, where happiness is defined as how much

people enjoy their life as a whole. The bottom five countries are (in descending order) Russia, Georgia, Armenia, Ukraine and Moldova, all in the former Soviet Union (FSU). Other transition countries such as Belarus, Bulgaria and the Kyrgyz Republic also score poorly. A similar pattern is apparent in Table 2.2 of Frey and Stutzer (2002a), with former Soviet Union countries doing badly on happiness scores and central European transition countries scoring higher but still below not only the richest OECD countries but also most of those in Asia or central and south America.[39]

Helliwell (2002) uses the first three waves of the World Values Survey to estimate a general happiness equation for all countries (similar to the approach we adopt below). He aggregates the transition countries into two groups – eastern Europe and the former Soviet Union. Interestingly, one experiment shows that subjective well-being was very low in both 1990 and the mid-1990s in the FSU, while in eastern Europe it started off even lower than in the FSU, but rose significantly in the intervening period.

Very few papers focus solely on a range of transition countries.[40] Hayo and Seifert (2002) analyse a subjective measure of *economic* well-being in ten eastern European countries in the early 1990s. This measure has a reasonably strong correlation with life satisfaction in the first wave of the survey in 1991 (the only year when both questions were asked). It is also correlated with GDP per capita, with the correlation rising over time, suggesting that objective data have become more accurate over time.

A number of other papers analyse the correlates of happiness in a specific country. Namazie and Sanfey (2001) focus on one of the poorest transition countries – the Kyrgyz Republic – using a household survey carried out in 1993. While some of the results are similar to those in empirical studies of more advanced countries, several are different. In particular, satisfaction appears to decline steadily with age, at least until the early sixties, in contrast to the U-shape pattern (with a mid-point somewhere around 40) commonly found in more advanced countries.[41] Also, there is

[39] One possible explanation for the low scores in some countries is the fact that many young, educated people with entrepreneurial skills have emigrated during the transition, and it is those people who, on average, tend to report higher satisfaction scores.
[40] Grün and Klasen (2005) is an exception in this respect.
[41] See, for example, Clark *et al*. (1996).

no correlation between happiness and education in transition countries, possibly (the authors speculate) because skills and education acquired under the old regime are of little use in the new circumstances.

Several papers examine happiness in Russia. For example, Veenhoven (2001) and Graham *et al*. (2004), both find high levels of unhappiness on average among Russians. Similar to Namazie and Sanfey (2001), Graham *et al*. also fail to find a significant impact of education on happiness in most specifications, while a U-shape does emerge with respect to age, but with a minimum around 47 years. Interestingly, however, the panel nature of the data allows the authors to identify tentatively a two-way causal effect between income and happiness. Senik (2002) identifies an important positive contribution to happiness by the relevant "reference" income. Another interesting finding is that the self-employed in Russia tend to be happier than employees, in contrast to evidence from Latin America (see Graham, 2004). However, this finding is not replicated in Lelkes's (2002) findings for Hungary.[42]

To sum up, there is a growing literature in the field of economics of happiness, yet more often than not the geographical coverage of these works is at best patchy. There are still too few papers focused on the systematic analysis of transition countries–possibly with the exception of Grün and Klasen (2005). While on the one hand a case-by-case in depth look at this issue, e.g. happiness in Russia, is certainly an instructive exercise, on the other hand, it lacks comparative rigour. Our contribution to this field aims to fill this gap insofar as the transition countries are concerned. We are, of course, constrained by the data availability concerns. However, at the time of the writing of the present paper, we have used the data with the largest coverage of transition countries (19) with the longest time span possible (from early 1990s to 2002 without compromising from the data comparability concerns, that is using the data coming from the same source.

Furthermore, the present study also benefits from the possibility of comparing and contrasting individuals' experiences in the transition countries with those of the non-transition countries. As such, the present paper aims to shed light into the

[42] The author has pointed out to us that a possible reason for this finding is a data problem, whereby many employees declare themselves as "self-employed" purely for tax purposes. Also, the well-being of the self-employed in Hungary appears, from the same research, to have increased over time.

similarities and differences between these two samples to arrive at a better understanding of the costs and opportunities related to the transition process from a command economy to market capitalism.

4.3 Subjective Data on Life Satisfaction and Its Potential Uses

4.3.1 In Defence of the Subjective Measures of Life Satisfaction:

Given that there is a tendency among academics to take survey results with a grain of salt, the obvious question to ask at this stage is whether these subjective measures are any good. Do these responses tell us anything worthy of consideration? Are they informative about individuals' life satisfaction, or are they simply noise?

Layard (2005) gives compelling reasons as to why these data should be taken seriously. The reasons for scepticism about the validity of these data could be summarised under following headings:

- Can people say with any confidence whether they are happy or not? In other words, given that happiness is an abstract concept for many, do people know when they are happy?

Layard (2005, pp.12-13) introduces a simple, but effective reasoning to approach this issue. Unlike many other questions people tend to face in surveys of social and/or attitudinal nature, the response rate is very high in questions related to happiness in comparison to the response rate of an average survey question. Hence, it is fair to conclude that the sheer scarcity of the "don't know" answers in surveys is telling evidence that people do know how satisfied they are with their lives and how happy they are in any given moment.

- Does everyone answering the questionnaires use the words in a similar way?

If not, the replies to the specific questions on happiness cannot withstand the scrutiny of being crosschecked. Yet, there seems to be evidence to the contrary. First of all, in some cases friends and colleagues of a survey respondent have been asked separately about the happiness of the person in question. Similarly, in many cases, the interviewers are also asked to give a rating about the composure of the

respondent. These two aforementioned measures tend to correlate well with the survey questions on happiness. There is even more good news: People tend to answer similarly about their own happiness be it an interview, or a survey that they are asked to fill out on their own. Therefore, one of the main concerns, namely the impact of the survey environment on the accuracy of the replies, is reasonably addressed in this point, (Diener and Suh 1999; Layard 2005, p.14).

- Semantic issues related to the concept of happiness

There are several ways to ask about people's happiness level. Veenhoven (2000) investigates this issue and reports that among the three possible ways of ranking countries based on how happy they are, how satisfied they are and how they would rate their lives using a scale from worst to the best possible life, the ranking stays the same in broad terms. This is the first piece of evidence that proves the point that all three measures actually relate to the very same concept.

- Does the fact that the surveys are carried out in different languages play a role on the validity of the data?

Sceptics might argue that given that the household surveys are translated to respondents' mother tongues, there might be some discrepancies between languages concerning the meaning attached to the concepts of happiness and life satisfaction. Another way to put this question is to ask whether happiness/life satisfaction means the same thing in all languages. Fortunately, there is evidence leading us to believe that the answer to this question is likely to be affirmative. Two examples should suffice to illustrate the point. Shao (1993) investigates whether there are multi-linguistic differences in life satisfaction scores among a group of American and Chinese students. Chinese students in the sample are asked a question on happiness both in their mother tongue and in English with a two-week time lapse in between. Given the dissimilarity of the two languages, the results are reassuring: Their average reported happiness levels are almost exactly the same in both questions and the answers are highly correlated. The level of correlation is reported to be identical to the correlation between answering the same question twice in Chinese with a three-week time span in between.

A further reassuring example comes from Layard (2005, p.34), where he draws attention to Switzerland, which is a remarkable case from the point of view of

linguistic differences. The majority of the population in Switzerland speaks French, German, or Italian. Nevertheless, people from these three different linguistic groups give similar answers to the happiness question. Furthermore, these groups consistently record higher levels of life satisfaction as opposed to people from the neighbouring countries speaking the same language. Hence, Layard argues that the happiness question reflects the way of life, and certainly not the impact of the language.

4.3.2 The Link to the Standard Economic Theory

Before proceeding to introduce the data used in the study in more detail, we will elaborate in this section on the links between economic theory and the present study so as to emphasise its value added. With this aim in mind, we should focus on the links between the model of life satisfaction we are proposing here with the standard economic theory of utility.

The two approaches to utility would be to attempt to measure it cardinally, or ordinally. Initially, classical economists (or the Utilitarians) viewed the concept of utility as something that had content, and thus something that can be measured. The key influence to this line of thinking was Bentham (1789) and Edgeworth (1881). The latter went so far as to introduce the idea of a hedonometer to measure utility. The basic idea was to maximise a utility function of the cardinal form, yet the measurement issue was never resolved clearly.

However, the theory has taken a shift towards the ordinal utility concept since 1930s in what is now called the new welfare economics. The leading figure of this revolutionary movement was Lionel Robbins (1932), whose critique was based on the idea that inter-personal utility comparisons are without content, and thus should be abandoned. He was convinced that utility could not be measured in a cardinal sense, but could be inferred from individuals' choices.

In response to Robbins's critique, the welfare economics limited itself to the weak axiom of revealed preferences, which allowed it only to examine ordinal relations based on observed choices. The underlying idea is very simple. Assume that individuals' true preferences are at the foundation of everything. Yet, these cannot be observed directly. What one can observe, however, are people's choices.

Therefore, on the basis of observed behaviour, the economist could state that if good X is preferred to good Y, then the individual should be at least as well of under X as under Y. In other words, one can call this the theory of revealed preferences. Revealed preferences provide the theoretician with a useful concept in that these preferences can then be mapped into graphical representations in the form of individuals' indifference curves.

This way of approaching the problem made interpersonal comparisons of utility impossible, and diminished the set of acceptable welfare criteria to one, namely the Pareto criterion, since it does not rely on interpersonal comparisons. The Pareto criterion is an ultimate simplification of real life situations, because in many case it is not straightforward to assign Pareto superiority to each and every resource allocation scheme, as some people are better off under X, and others under Y. In other words, reliance on the Pareto criterion has a fundamental problem. The presence of this fundamental problem was further emphasised by Sen (1982, 1984 and 1999) as well as the Impossibility Theorems of Kenneth Arrow, according to which a perfect aggregation from individual preferences to societal choice functions is impossible without violating the underlying assumptions of rationality and fairness.[43]

From a practical point of view, however, economists have always been willing to make inter-personal comparisons and to assume cardinal utility functions. These are typically defined as a function of income and consumption in standard economic practice. Consequently, a crude measure such as GDP per capita is often treated as a measure of welfare. Grün and Klasen (2001 and 2003) convincingly argue that the treatment of measures like real per capita income as valid measures of welfare comparisons requires a set of very strict assumptions. Such an approach would require every individual to have identical and unchanging cardinal utility functions and that income (or consumption) to enter this utility function linearly. An improvement over this approach is to relax the linear utility function in favour of a concave one, yet at the cost of requiring every individual to earn the per capita income and to consume

[43] Arrow's theorem has two versions and its most famous application is to voting schemes. In one version, fairness of a voting mechanism is guaranteed by the assumptions of universality, non-dictatorships, non-imposition, monotonicity of preferences and independence of irrelevant alternatives. In the second version, Pareto efficiency is assumed instead of the assumption of monotonicity. In both cases, it is impossible to come up with a societal choice function/preference ordering satisfying all these conditions simultaneously. For details, See Arrow (1950 and 1951).

the mean commodity bundle.[44] Alternatively, the Samuelson approach would take an individualistic methodology arriving at social welfare by aggregation from the individual welfare, which is, in turn, based on the revealed preferences approach described earlier. However, this approach is also based on restrictive assumptions in that among others it requires individuals' preferences to be complete, convex and monotonically increasing.[45]

The point of the flourishing economics of happiness research in the context described above is to attempt to measure utility directly rather than equating utility to income or consumption. This certainly does not solve what has been called a fundamental problem in the discussion above. However, this strand of research is likely to yield supplementary –maybe even superior- information about well-being than a strict reliance on incomes. Furthermore, in the approach that is taken in this paper, by using an ordered probit model of life satisfaction, we are also relaxing the assumption of full cardinal comparability, which is inherent to an approach that relies on income as the welfare measure.[46]

Based on the discussion outlined above, one could also read the present paper as an empirical inquiry related to the concept of utility. To do this, it suffices to treat our dependent variable –life satisfaction/happiness- as a proxy for an indirect utility function, and the ordered probit model employed could, in this case, yield what should be included in a utility function –on the basis of stated (subjective) as opposed to revealed preferences.[47]

Before concluding the theoretical discussion, a final remark on the potential uses of the research in economics of happiness would be well-placed. Layard (2005, p.132) suggests that the results of this research agenda could well be applied in a modified cost-benefit analysis whereby the extent to which money matters for particular groups is taken into account and corresponding weights are given to the amounts of compensations. Similarly, particular weights could be attached to

[44] This approach is explained in detail in Sen (1984).
[45] For further details, see Samuelson (1947), for a critical overview see Grün and Klasen (2001).
[46] It must be noted in passing that this approach advocated in the economics of happiness research agenda is in stark contrast to Friedman (1953) critique, which is seen as a manifesto of the positivist methodology of economics. Accordingly, economists should study how people behave, not what they say. For a discussion of the shortcomings of this approach and an in-depth discussion of what economics can learn from the happiness research, see Frey and Stutzer (2002a, pp.171-184).

[47] Our theoretical interpretation is in accordance with Kahnemann et al. (1997), which can be seen as a strong axiomatic defence of the concept of experienced utility and its use in economics.

changes affecting the well-being of the most miserable groups in the society. Following this train of thought, one could easily discern the potential benefits from research on happiness, which could lead to substantive modifications in well-known economic concepts such as the Coasean bargaining, commons problem, contract theory etc. These are areas which will not be pursued for the purposes of this paper.

4.4 The Data Used in the Study

All of the micro data used in the present paper comes from the integrated data set of World Values Survey and European Values Survey (WVS-EVS, or WVS for short).[48] These surveys are a major multi-country effort to gain insight into people's basic values and attitudes across a broad range of issues, including politics and economics, family and religious values, gender issues and environmental awareness. The WVS has been implemented in four waves so far: (i) 1981-84, (ii) 1990-93, (iii) 1995-97, and (iv) 1999-2002. The first wave covered only 24 societies.[49] The sample grew with the second wave which covered 43 societies. The third and the fourth waves covered 62 and 82 societies respectively. Thus, the latest wave of the WVS covers countries that together account for about 85 per cent of the world's population. This section and the following section focus on wave four only, which includes 19 transition countries (see Annex), while section 5 considers evidence from the earlier waves.

For our purposes, the key question from the WVS is the following, to which respondents were asked to mark their answers on a scale from 1 (most dissatisfied) to 10 (most satisfied):

"All things considered, how satisfied are you with your life as a whole these days?"[50]

WVS also includes a question on life satisfaction. However, in the light of the discussion presented in section 4.3.1., we choose to base all our analysis using this

[48] European and World Values Surveys are carried out by two separate groups of researchers, and are integrated in a data file for research purposes to ensure cross-national and across-time comparisons.

[49] The common units of analysis in this dataset are countries. However, societies in this context are introduced as a broader concept, since occasionally some samples, which are regionally rather than nationally representative are also surveyed. For example, Andalucia, Basque Country, Galicia, and Valencia as well as a national representative sample for Spain were surveyed in wave three. For our practical purposes, only sovereign countries were included in the econometric analyses.

[50] Our choice of dependent variable is justified both by the fact that this variable is the most widely used dependent variable in the economics of happiness literature, and also by the discussion above, where we refer to consistency all across the board between different ways of collecting data on life satisfaction.

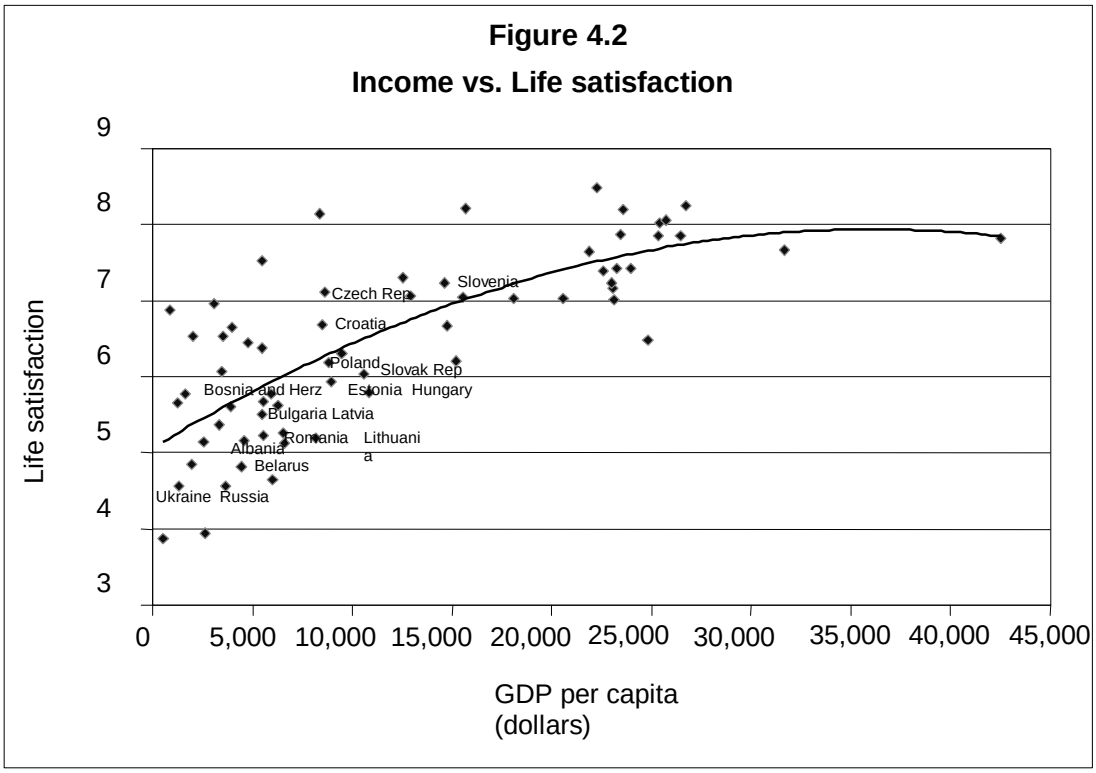
question as a dependent variable. This approach is further supported by Blanchflower and Oswald (2004), which argues that the estimated life satisfaction and happiness equations have almost identical form. Hence, our results could be generalised in this context, and the terms happiness and life satisfaction will be used interchangeably for the purposes of the present study.

The answers vary widely both within and across countries. Figure 4.2 considers the cross-country variation. It shows the mean score, by country, of the responses and compares it with a measure of objective well-being, namely GDP per capita (in current international dollars) adjusted for purchasing power parity (PPP). Since the fourth wave of the WVS-EVS was carried out over a three-year interval between 1999 and 2002, we tracked the exact timing of the survey implementation for each country, and assumed a one-year lag in GDP per capita figures in relation to the time of the survey. That is, if the survey was implemented in country X in 2001, then we compare it with the GDP per capita (PPP-adjusted) of country X in 2000.

The evidence in Figure 4.2 shows the expected positive relationship between GDP per capita and self-reported satisfaction; though the link between the two appears to tail off at higher levels of GDP per capita. In fact, a simple quadratic trend fits the relation quite well, with a significant correlation of 0.74 between the two series. Interestingly, most transition countries fall below this trend, with only Croatia, the Czech Republic and the Slovak Republic (three of the most advanced countries in the region) lying above the trend.[51] That is, people in most transition countries tend to report lower levels of satisfaction than would be predicted by a quadratic regression of satisfaction on GDP per capita. This is the first bit of evidence from the latest wave of the WVS of the difficulties faced by individuals in the region.

[51] With the exception of Serbia and Montenegro, which has been treated as two separate entities by the WVS. However, comparable macroeconomic data on GDP per capita for this country were not available at this level of disaggregation.

Figure 4.2
Income vs. Life satisfaction



Source: WVS and World Development Indicators.

Table 4.1 contains a more detailed examination of where transition countries stand in relation to other countries. The table shows that four countries in the region – Moldova, Ukraine, Russia and Belarus – are in the bottom decile in terms of satisfaction scores. Two of the Baltic states – Latvia and Lithuania – are in the next-to-bottom category, along with Albania, FYR Macedonia and Romania. In general, the new EU members score much better, with Slovenia (the richest country in the region in terms of GDP per capita) in the 70-80 decile and the Czech Republic in the 60-70 category. Slovenia's score of 7.23 puts it above France (7.01) and not far off from Great Britain and Germany (7.40 and 7.42 respectively) in terms of life satisfaction.

Another way of comparing subjective measures of satisfaction with objective economic circumstances is to compare the responses to the question above with cumulative growth over the transition period (see Figure 4.3). People's assessments of their well-being are often influenced by their economic situation relative to what it used to be, rather than by the absolute standard of living. Indeed, this is one of the reasons why the link between GDP and happiness is much weaker once countries manage to rise to a point of reasonable prosperity. All transition countries suffered

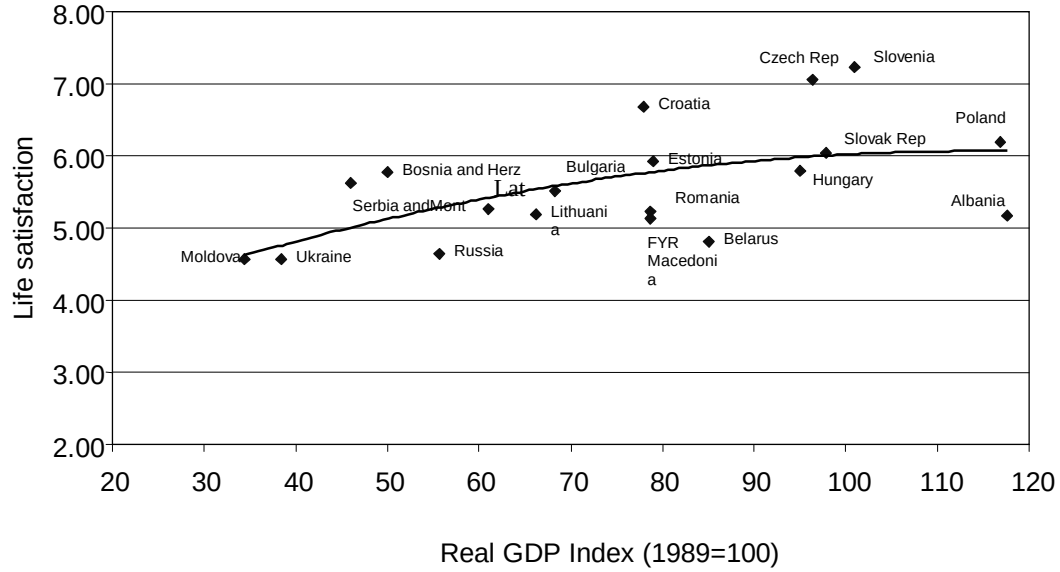
deep recessions in the early years of transition, though the duration and extent of the decline in real output varied widely from one country to the next. As Figure 4.3 shows, there is indeed a positive correlation between two variables: life satisfaction (on the y-axis), and an index of real GDP that takes the value of 100 for all countries in 1989 (on the x-axis). The correlation coefficient between the two variables is 0.54. The fact that this correlation is somewhat weaker than the correlation in Figure 4.2 and that there is considerable variation across countries suggests that many other factors are possibly driving the responses to this question. The next section, therefore, uses econometric techniques to investigate more deeply the correlates of life satisfaction.

Table 4.1: Average life satisfaction scores and percentiles by country

Lowest percentiles	Country	Life satisfaction
0-10	Moldova	4.56
	Ukraine	4.56
	Russia	4.65
	Belarus	4.81
10-20	FYR Macedonia	5.12
	Albania	5.17
	Lithuania	5.20
	Romania	5.23
	Latvia	5.27
20-30	Bulgaria	5.50
	Serbia	5.62
	Montenegro	5.64
30-40	Bosnia and Herzegovina	5.77
	Hungary	5.80
	Estonia	5.93
	Slovak Republic	6.03
40-50	Poland	6.20
50-60	Croatia	6.68
60-70	Czech Republic	7.06
70-80	Slovenia	7.23

Note: The table shows the average satisfaction score by country, and the corresponding decile into which each country falls. Source: WVS Wave 4.

Figure 4.3:
Life satisfaction vs. GDP Growth-Transition Countries



Source: WVS and EBRD.

4.5 Econometric Specification and Results

So far, this paper has looked at aggregate satisfaction scores across countries and their relationship with GDP. However, in order to derive a better understanding of what drives people's responses to this question, we estimate a series of microeconometric equations. Our hypothesis is that self-reported satisfaction scores are a function both of individual-specific and economy-wide variables. We, therefore, estimate the following equation:

$$S_{ij} = f(X_{ij}, Z_j, \varepsilon_{ij}), \qquad (4.1)$$

where S_{ij} is a vector of satisfaction scores (on a scale of 1 to 10) of individual i in country j, X_{ij} is a matrix of explanatory variables that vary across individual and country, Z_j is a matrix of macroeconomic variables that vary by country only, and ε_{ij} is a vector of idiosyncratic errors.

In line with much of the previous literature, we include the following microeconomic variables (all of which are taken from the WVS): gender, marital status, income group, employment status, education, and age variables. Marital status is divided into married, living together, divorced, separated, widowed, and single. Income group is divided into three dummy variables: lower income, middle

income and higher income groups.[52] The breakdown of the employment status variable is as follows: full-time (30 hours a week and more), part-time (less than 30 hours a week), self-employed, retired, housewife, student, unemployed and other. The education variable is split into: inadequately completed elementary education, completed (compulsory) primary education, incomplete secondary education (technical, vocational type), complete secondary school (technical, vocational type), incomplete secondary school (university preparatory type), complete secondary school (university preparatory type), some university education without degree, and finally university education with degree.

The macroeconomic variables in equation (1) include GDP per capita (PPP-adjusted), the unemployment rate, the inflation rate and the Gini coefficient, which captures the impact of income inequality on satisfaction. In addition, the state of reform may also be relevant for happiness in transition countries. We, therefore, include the average transition score for each country, as measured by the EBRD transition indicators.[53] It is unclear *a priori* what the sign of this variable may be. On the one hand, progress in transition is generally associated with better economic performance, and hence a higher degree of satisfaction. On the other hand, transition is a time of upheaval and disruption, and it is possible that people in countries that lag behind in transition are (other things being equal) happier for that reason. We also experiment by dividing this variable into *initial-phase* reforms, which capture progress in price liberalisation, foreign exchange and trade liberalisation and small-scale privatisation, and *second-phase* reforms, which include large-scale privatisation, governance and enterprise restructuring, competition policy, infrastructure, banking and interest rate liberalisation, and non-bank financial institutions (see the data Annex for more details).

[52] Although the survey included questions on the actual household income, we have opted against using them for the simple reason that these were not adjusted for the purchasing power parity. In other words, the value of having 1 US dollar was not the same across countries. We have used another question which was asking the respondents to choose between lower, middle and higher income groups, which implicitly assumes that the income distribution, price levels and all the other relevant factors were taken into account in the respondents' answers.

[53] The transition indicators range from 1 (little or no progress in reform) to 4+ (standards of an advanced industrialised economy). When calculating averages, pluses and minuses are converted to numerical equivalents by adding or subtracting 0.33 (e.g., 2+ becomes 2.33 and 3- is 2.67). See the EBRD *Transition Report*, various issues, for a full description of the methodology underlying these scores.

Up to now, we have for convenience treated our dependent variable – life satisfaction – as a cardinal measure when taking within-country averages and comparing across countries. However, there is no presumption that the difference between a score of 4 and 5, for example, is the same as that between 5 and 6. Therefore, in line with most of the recent literature, we treat this variable in our estimation procedure as ordinal and estimate equation (1) by an ordered probit model, rather than by ordinary least squares. In the discussion that follows, a positive (and statistically significant) coefficient on an explanatory variable indicates a positive association with life satisfaction, in the sense that it increases the probability of being in the highest category (satisfaction = 10) and decreases the probability of recording the lowest score (satisfaction = 1).[54]

Table 4.2 presents the results of the ordered probit regressions[55] for the whole sample, the transition countries sample and the non-transition countries sample, respectively in columns one to three. Our initial approach is to capture country-specific fixed effects by adding country dummies, rather than including the macroeconomic variables discussed above. We also include employment status, marital status, education, income group, age and age squared, all of which have been shown elsewhere to be important determinants of life satisfaction.

Turning first to column 1 of Table 4.2, which includes both transition and non-transition countries, many of the results parallel those of other cross-country studies. For example, most categories of employment status are associated with lower values of satisfaction relative to full-time employment (the omitted category in the regression). Unemployment has a particularly negative effect on satisfaction; other things being equal, being unemployed rather than full-time employed raises the probability of recording the lowest level of satisfaction by approximately three percentage points. Satisfaction tends to rise with educational status, particularly at high levels of education, and with income, while being married is associated with more satisfaction than other types of living arrangements. Finally, the data exhibit the

[54] The effect on the probability of being in the intermediate categories cannot be determined solely by looking at the value of the coefficient.

[55] Ordered probit was selected as the appropriate strategy for the regressions not only because of the nature of the dependent variable, but also due to theoretical considerations related relaxing the full cardinal comparability assumption in comparisons of well-being as discussed in section 4.3.2. However, as a robustness check we have rerun all the regressions systematically with OLS. Overall the same conclusions hold, and in some cases the results highlighted in the text are strengthened using OLS regressions.

familiar U-shape pattern with regard to age, with a minimum point at around age 46, and show males are less happy than females, a finding that appears in several other studies.[56] The country dummies for transition countries (not reported in the table) are almost all negative and statistically significant relative to the reference country, Germany.

Columns 2 and 3 report the results from the same regression model for transition and non-transition countries respectively. A quick glance at the results shows a large number of similarities between the two sub-groups, but also some important differences. It is the latter that are of most interest here. Turning first to employment status highlights one of the most interesting results: self-employment in transition countries is positively (and statistically significant at 10 per cent) associated with satisfaction, whereas the sign is reversed in the non-transition case. There is evidence from previous research that, for those willing to take the risk, self-employment is a successful coping strategy in transition (see, for example, EBRD, 2000, Chapter 5, and Dutz *et al*., 2004).[57] The results in column 2 are an interesting complement to this earlier research, and highlight the importance of further developing entrepreneurship in the transition context.

A second interesting contrast between the two samples concerns the effects of education. In both cases, education is positively correlated with higher life satisfaction, but in the transition sample this effect becomes particularly significant at higher levels of education. In the transition context, many skills acquired under the old regime became redundant once transition started, but the value of having a relatively high degree of education may have increased in the more difficult environment. This may help to explain why there is little difference in the satisfaction scores at low levels of education but a positive effect at higher levels.

A third result of interest concerns the effects of age. In both cases, we find the usual U-shape effect, but the minimum age, after which the curve slopes upwards, comes significantly later in life for those in the transition sample (52.2) as opposed to those elsewhere (44.8).[58] In general, older people in transition countries have found it

[56] Clark (1997), for example, finds that women are significantly happier than men in the workplace.
[57] The self-employed may also find it easier to conceal part or all of their employment income, and this may also help to explain their relatively high scores on satisfaction.
[58] We have experimented with replacing the quadratic age term by dummies for age intervals (20-29, 30-39, etc.) and the same broad conclusions hold.

harder to cope with the changes brought by transition, perhaps because they have lost jobs and have little hope of finding new ones, and this may lie behind this difference. However, the significance of the results related to the age variable should not be taken too literally. A word of caution is due at this stage, since sample selection issues are likely to play a role here. Given that the unhappy people tend to die earlier (for instance through means like suicide), only relatively happier and old people are left in the sample. Although this would bias our estimates of the age variable, there is no reason to expect this bias to differ systematically in the non-transition case. Hence, it should be emphasised that even in the presence of a potential sample selection bias –affecting both samples equally-, the turning point in the transition sample comes much later.

Finally, the effect of gender is different in the two sub-samples. While males continue to be less happy than females in the non-transition case, the correlation is much weaker in the transition sample, and statistically significant only at the 10 per cent level.[59] Nevertheless, we have explored whether the results in the transition region change significantly when the sample is split between males and females. By and large, the main conclusions hold.[60]

The pattern that emerges from the estimates of the country dummies included in the regressions requires further explanation. First of all, when the regressions are run for the whole sample in column 1 of Table 4.2, all the dummies for the transition countries are negative and significant at 1% level with the single exception of Slovenia, which is negative, but only significant at 10%. In other words, living in transition countries (as opposed to Germany, the reference category) reduces the probability of reporting the highest happiness levels. In the second column of the same table, we restrict the sample to transition countries only and run the regressions again with fixed effects, yet this time the reference category is the Russian Federation. The results are more varied in this case. The dummies for the majority of transition countries in our sample are positive and significant at 1% level

[59] Part of the explanation for this result is that, in many transition countries, the relative status of women appears to have worsened during transition. Klasen (1993) is an early contribution to this literature where women are identified as the relative losers of transition. Our results are not necessarily in contradiction to Klasen's interpretation. In our regressions, women appear over and over as the happier gender in both the overall sample and the non-transition countries sample. Yet, when it comes to the transition sample, the male dummy loses its significance, meaning that in our regressions women are losers relative to their counterparts elsewhere in the world.

[60] These results are reported in the appendix.

with the exception of Belarus and FYR Macedonia, which are both positive, yet significant at 5% level. This means that living in transition countries other than the Russian Federation increases the probability of reporting the highest satisfaction levels (with respect to living in the aforementioned reference country). However, this result does not hold for the case of Ukraine. The dummy for Ukraine is still negative (as was in column 1), but no longer significant at the conventional levels.

Table 4.2: Satisfaction equations (WVS wave four)

	(1): Whole sample		(2): Transition countries		(3): Non-transition countries	
Employment status						
Part-time	**-0.038**	***	**0.037**		**-0.057**	***
	0.015		*0.033*		*0.016*	
Self-employed	**-0.023**	*	**0.075**	**	**-0.045**	***
	0.014		*0.035*		*0.015*	
Retired	**-0.035**	**	**-0.031**		**0.025**	
	0.016		*0.029*		*0.020*	
Housewife	**0.037**	***	**0.024**		**0.019**	
	0.014		*0.036*		*0.016*	
Student	**-0.015**		**0.077**	*	**-0.035**	*
	0.017		*0.040*		*0.018*	
Unemployed	**-0.264**	***	**-0.266**	***	**-0.266**	***
	0.015		*0.027*		*0.018*	
Other	**-0.076**	***	**0.033**		**-0.117**	***
	0.027		*0.065*		*0.029*	
Education						
Completed primary	**0.041**	***	**0.021**		**0.061**	***
	0.016		*0.041*		*0.017*	
Incomplete secondary (technical)	**0.082**	***	**0.090**	**	**0.108**	***
	0.018		*0.045*		*0.020*	
Completed secondary (technical)	**0.075**	***	**0.116**	***	**0.091**	***
	0.016		*0.042*		*0.018*	
Incomplete secondary (uniprep)	**0.040**	**	**0.071**		**0.062**	***
	0.018		*0.046*		*0.020*	
Completed secondary (uniprep)	**0.100**	***	**0.157**	***	**0.094**	***
	0.016		*0.041*		*0.018*	
University. w/o degree	**0.132**	***	**0.272**	***	**0.127**	***
	0.019		*0.053*		*0.020*	
University w/ degree	**0.157**	***	**0.321**	***	**0.116**	***
	0.017		*0.043*		*0.019*	
Marital status						
Live together	**-0.082**	***	**-0.152**		**-0.082**	***
	0.025		*0.125*		*0.026*	
Divorced	**-0.234**	***	**-0.261**	***	**-0.216**	***
	0.018		*0.030*		*0.024*	
Separated	**-0.320**	***	**-0.274**	***	**-0.330**	***
	0.033		*0.079*		*0.037*	
Widowed	**-0.227**	***	**-0.200**	***	**-0.213**	***
	0.018		*0.029*		*0.023*	
Single	**-0.148**	***	**-0.129**	***	**-0.147**	***
	0.012		*0.026*		*0.013*	
Div, sep or wid	**-0.264**	***	-		**-0.316**	***
	0.098		-		*0.098*	

Table 4.2: Satisfaction equations (WVS wave four)

	(1): Whole sample		(2): Transition countries		(3): Non-transition countries	
Income group						
Middle income	**0.199**	***	**0.191**	***	**0.199**	***
	0.009		*0.019*		*0.011*	
Higher income	**0.395**	***	**0.455**	***	**0.367**	***
	0.010		*0.021*		*0.012*	
Age	**-0.030**	***	**-0.040**	***	**-0.026**	***
	0.002		*0.003*		*0.002*	
Age–squared (x10^3)	**0.317**	***	**0.385**	***	**0.289**	***
	0.018		*0.036*		*0.020*	
Male dummy	**-0.058**	***	**-0.028**	*	**-0.077**	***
	0.008		*0.015*		*0.010*	
Number of observations	*80,677*		20,256		60,421	
Pseudo-R^2	*0.055*		0.042		0.051	
Minimum age	**46.9**		**52.2**		**44.8**	

Notes: Ordered probit regressions with heteroskedasticity-robust standard errors and country fixed effects. Omitted country variable is Germany for columns 1 and 3, and Russia for column 2. For other omitted dummy variables (reference categories), see data annex. Source: WVS.

So far, we have restricted ourselves to analysing the individual-specific correlates of satisfaction, while country-specific differences have been absorbed in the country dummy variables. We now investigate whether important effects are coming through from macroeconomic variables, and we include these in the regression in place of the country dummies. Table 4.3 reports the results, again for the whole sample, the transition and the non-transition countries respectively, with four macro variables: GDP growth; the unemployment rate; end-year inflation; and the Gini coefficient (to capture income inequality).[61]

Turning first to the full sample, per capita GDP has the expected positive impact on the probability of happiness. Somewhat surprisingly, the Gini coefficient also has a positive sign, contradicting the *a priori* expectation that people dislike inequality. Neither unemployment nor inflation has a statistically significant impact on happiness. Interestingly, the effects of gender and education are now much weaker relative to the previous results.

[61] A technical problem arises when variables on the right-hand side of the equation are at a higher level of aggregation than the left-hand side variable, namely, that the standard errors are biased downwards, and hence the degree of statistical significance may be exaggerated. Intuitively, this is because these variables have a small number of independent observations relative to the size of the sample. We control for this by a "clustering" option that relaxes the assumption that the errors are independent across observations, replacing it with the assumption of independence across clusters. This leads to wider standard errors and more valid statistical inference. The method was suggested by Rogers (1993) as a generalisation of Huber (1967).

Table 4.3: Satisfaction equations with macroeconomic variables

	(1): Whole sample		(2): Transition countries		(3): Non-transition countries	
GDP per capita (x10^3)	**0.038**	***	**0.089**	***	**0.029**	***
	0.005		*0.013*		*0.005*	
Unemployment	**-0.003**		**0.001**		**-0.003**	
	0.006		*0.004*		*0.006*	
Inflation (x10^3)	**-0.011**		**0.052**	***	**-3.286**	***
	0.027		*0.017*		*1.263*	
Gini coefficient	**0.018**	***	**-0.012**	**	**0.023**	***
	0.007		*0.005*		*0.006*	
Employment status						
Part-time	**-0.055**	*	**0.019**		**-0.076**	*
	0.033		*0.045*		*0.032*	
Self-employed	**0.025**		**0.067**		**-0.054**	**
	0.052		*0.044*		*0.024*	
Retired	**-0.133**	***	**-0.062**	**	**-0.014**	**
	0.039		*0.028*		*0.035*	
Housewife	**0.028**		**0.082**		**-0.075**	
	0.063		*0.055*		*0.064*	
Student	**0.006**		**0.126**	***	**-0.050**	
	0.043		*0.043*		*0.037*	
Unemployed	**-0.273**	***	**-0.276**	***	**-0.287**	***
	0.053		*0.049*		*0.059*	
Other	**-0.049**		**-0.042**		**-0.160**	**
	0.056		*0.091*		*0.069*	
Education						
Complete primary	**0.052**		**0.022**		**0.111**	**
	0.044		*0.062*		*0.054*	
Incomplete secondary (technical)	**0.055**		**0.015**		**0.167**	***
	0.065		*0.099*		*0.062*	
Complete. secondary (technical)	**-0.016**		**0.081**		**0.101**	**
	0.071		*0.081*		*0.051*	
Incomplete secondary (uniprep)	**-0.005**		**-0.019**		**0.168**	**
	0.093		*0.101*		*0.073*	
Complete secondary (uniprep)	**0.003**		**0.069**		**0.102**	*
	0.066		*0.087*		*0.057*	
University w/o degree	**0.135**	**	**0.238**	**	**0.182**	*
	0.061		*0.104*		*0.063*	
University w/ degree	**0.054**		**0.260**	***	**0.112**	*
	0.062		*0.081*		*0.060*	
Marital status						
Live together	**0.280**	*	**0.144**	***	**0.172**	
	0.166		*0.053*		*0.141*	
Divorced	**-0.262**	***	**-0.271**	***	**-0.119**	***
	0.054		*0.034*		*0.045*	
Separated	**-0.215**	***	**-0.265**	*	**-0.222**	*
	0.061		*0.155*		*0.059*	
Widowed	**-0.237**	***	**-0.222**	***	**-0.144**	***
	0.044		*0.037*		*0.045*	

Table 4.3: Satisfaction equations with macroeconomic variables

	(1): Whole sample		(2): Transition countries		(3): Non-transition countries	
Single	**-0.104**	***	**-0.091**	***	**-0.139**	***
	0.033		*0.026*		*0.037*	
Income group						
Middle income	**0.201**	***	**0.194**	***	**0.189**	***
	0.028		*0.053*		*0.035*	
Higher income	**0.376**	***	**0.423**	***	**0.333**	***
	0.057		*0.078*		*0.075*	
Age	**-0.027**	***	**-0.037**	***	**-0.025**	***
	0.004		*0.005*		*0.005*	
Age –squared (x10^3)	**0.294**	***	**0.346**	***	**0.306**	***
	0.045		0.057		0.057	
Male dummy	**-0.041**		**-0.018**		**-0.101**	**
	0.032		*0.030*		*0.019*	
Number of observations	47,936		14,394		33,542	
Pseudo-R^2	0.034		0.036		0.03	
Minimum age	45.7		53.8		41.1	

Note: See Table 4.2 and the data annex for variable description and reference categories. All regressions are carried out using a "clustering" option to control for downward bias of standard errors in the presence of macroeconomic variables. Sources: WVS and World Development Indicators.

In the transition sub-sample (column 2), several results are worth highlighting. One surprising result is the positive (and statistically significant) association between inflation and satisfaction. It is difficult to think of a good rationale for this, as the evidence from advanced countries is that inflation is generally disliked and has a negative effect on happiness.[62] It is possible that inflation is correlated with wealth-distribution effects that, in net terms, have a positive effect on transition. Or low inflation may be associated with fiscal austerity and cutbacks in essential services. In other words, inflation might appear a lesser evil compared to the alternative of curbing it, which could be costly , especially in terms of unemployment, in the short term.

A second point is the strong negative effect of inequality on satisfaction (in contrast to the positive association in the non-transition case), suggesting a lingering dislike of inequality that was characteristic of socialist systems.[63] Finally, the positive

[62] See, for example, di Tella *et al*. (2001).

[63] Senik (2004) investigates this issue for Russia, using five years of panel data, and finds no relation between regional Gini coefficients and life satisfaction. A positive relation between the two variables, using British household panel data, is found in Clark (2004), which also provides a brief survey of other investigations into this question. In the context of transition, the Gini coefficient might also be partially capturing effects of the stark fall in income. In fact, when changes in income are controlled for, the Gini coefficient continues to be negative in transition, but loses its significance. This is expected, since the two variables are closely correlated. The positive and significant sign on this coefficient

coefficient on self-employment found earlier remains in this case, but the statistical significance falls just short of conventional (10 per cent) levels.

Table 4.4 presents a further set of results based on the transition sample only. We now include not only the macro variables from the previous table, but also a reform indicator – the EBRD transition indicator described earlier. Column 1 suggests that this variable adds little to the explanatory power of the equation; the variable has a positive sign but is highly insignificant. However, this variable has a very close correlation (0.70) with GDP per capita, and it is likely that significant multicollinearity is present. Column 2 shows some evidence in this direction. Once we leave GDP per capita out of the regression, the EBRD Reform variable immediately assumes a positive sign and a significance level at 1 per cent. Other things being equal, the results of column 2 suggest that living in a country with an advanced level of transition (EBRD = 3.52, similar to Czech Republic) rather than a low-transition country (EBRD = 1.5, Belarus) has a substantial effect on the probability of recording the highest level of satisfaction.

To explore this issue further, we experiment in columns 3 and 4 by introducing initial- and second-phase reforms separately with GDP per capita. The results provide some support for the positive role of initial-phase reforms, as this variable is positive and statistically significant (at 10 per cent), in the presence of GDP per capita in the regression. Second-phase reforms have a negative sign but the coefficient is not statistically significant. Finally, in column 5, we introduce all of the aforementioned variables simultaneously, and the same conclusions hold.

survives in the non-transition sample, however. To investigate into the reasons of this requires further research. For the purposes of this study, suffice it to say that the impact of inequality is systematically different in transition countries compared to non-transition countries.

Table 4.4: Satisfaction equations with macroeconomic and reform variables

Transition Sample

	(1)		(2)		(3)		(4)		(5)	
GDP per capita (x10^3)	**0.085**	***	**-**		**0.081**	***	**0.090**	***	**0.094**	***
	0.015		*-*		*0.012*		*0.016*		*0.011*	
Unemployment	**0.000**		**-0.012**		**-0.004**		**0.001**		**-0.013**	
	0.005		*0.009*		*0.006*		*0.004*		*0.010*	
Inflation (x10^3)	**0.053**		**0.036**		**0.057**	***	**0.052**	***	**0.063**	***
	0.016		*0.023*		*0.016*		*0.017*		*0.016*	
Gini coefficient	**-0.012**	**	**-0.013**	**	**-0.010**	**	**-0.012**	**	**-0.006**	***
	0.005		*0.006*		*0.005*		*0.005*		*0.005*	
EBRD Reform	**0.038**		**0.357**	***	-		-		-	
	0.083		*0.094*		*-*		*-*		*-*	
EBRD1-Initial Phase Reform	-		-		**0.081**	*	-		**0.227**	*
	-		*-*		*0.048*		*-*		*0.129*	
EBRD2-Second Phase Reform	-		-		-		**-0.004**		**-0.239**	
	-		*-*				*0.112*		*0.191*	
Employment status										
Part-time	**0.019**		**-0.038**		**0.020**		**0.019**		**0.023**	
	0.045		*0.052*		*0.045*		*0.045*		*0.046*	
Self-employed	**0.068**		**0.022**		**0.066**		**0.067**		**0.059**	
	0.043		*0.057*		*0.043*		*0.043*		*0.040*	
Retired	**-0.064**	**	**-0.084**	***	**-0.067**	**	**-0.062**	**	**-0.067**	**
	0.029		*0.026*		*0.027*		*0.030*		*0.029*	
Housewife	**0.078**		**0.002**		**0.068**		**0.082**		**0.054**	
	0.058		*0.075*		*0.056*		*0.057*		*0.051*	
Student	**0.123**	***	**0.073**	**	**0.116**	***	**0.126**	***	**0.108**	**
	0.043		*0.043*		*0.042*		*0.043*		*0.042*	
Unemployed	**-0.279**	***	**-0.331**	***	**-0.286**	***	**-0.276**	***	**-0.288**	***
	0.050		*0.043*		*0.049*		*0.050*		*0.049*	
Other	**-0.047**		**-0.074**		**-0.050**		**-0.042**		**-0.032**	
	0.090		*0.092*		*0.091*		*0.090*		*0.085*	
Education										
Completed primary	**0.025**		**0.096**	*	**0.036**		**0.022**		**0.052**	
	0.058		*0.051*		*0.059*		*0.060*		*0.065*	
Incomplete secondary (technical)	**0.012**		**0.020**		**0.022**		**0.016**		**0.072**	
	0.095		*0.090*		*0.095*		*0.094*		*0.091*	
Completed secondary (technical)	**0.085**		**0.132**	*	**0.093**		**0.080**		**0.093**	
	0.076		*0.080*		*0.077*		*0.076*		*0.070*	
Incomplete secondary (uniprep)	**-0.008**		**0.085**		**0.012**		**-0.020**		**0.018**	
	0.092		*0.119*		*0.096*		*0.091*		*0.090*	
Completed secondary (uniprep)	**0.072**		**0.102**		**0.083**		**0.069**		**0.103**	
	0.083		*0.075*		*0.082*		*0.086*		*0.086*	
University. w/o degree	**0.239**	**	**0.252**	**	**0.243**	**	**0.238**	**	**0.250**	**
	0.104		*0.102*		*0.103*		*0.104*		*0.102*	
University w/ degree	**0.264**	***	**0.285**	***	**0.275**	***	**0.260**	***	**0.288**	***
	0.077		*0.075*		*0.076*		*0.078*		*0.074*	

Table 4.4: Satisfaction equations with macroeconomic and reform variables

Transition Sample

	(1)		(2)		(3)		(4)		(5)	
Marital status										
Live together	**0.131**	**	**-0.161**		**0.106**		**0.145**	***	**0.099**	
	0.062		*0.135*		*0.067*		*0.056*		*0.068*	
Divorced	**-0.271**	***	**-0.248**	***	**-0.268**	***	**-0.271**	***	**-0.257**	***
	0.034		*0.046*		*0.034*		*0.034*		*0.036*	
Separated	**-0.267**	*	**-0.260**	*	**-0.266**	*	**-0.265**	*	**-0.258**	*
	0.155		*0.152*		*0.154*		*0.154*		*0.153*	
Widowed	**-0.222**	***	**-0.220**	***	**-0.221**	***	**-0.222**	***	**-0.218**	***
	0.037		*0.042*		*0.038*		*0.037*		*0.037*	
Single	**-0.091**	***	**-0.059**	**	**-0.092**	***	**-0.091**	***	**-0.096**	***
	0.025		*0.028*		*0.026*		*0.026*		*0.028*	
Income group										
Middle income	**0.193**	***	**0.191**	***	**0.192**	***	**0.194**	**	**0.197**	***
	0.053		*0.054*		*0.052*		*0.052*		*0.051*	
Higher income	**0.420**	***	**0.403**	***	**0.415**	***	**0.423**	***	**0.418**	***
	0.079		*0.083*		*0.078*		*0.079*		*0.080*	
Age	**-0.037**	***	**-0.036**	***	**-0.038**	***	**-0.037**	***	**-0.039**	***
	0.005		*0.006*		*0.005*		*0.005*		*0.005*	
Age -squared (x10^3)	0.347	***	0.336	***	0.352	***	0.346	***	0.361	***
	0.058		0.064		0.058		0.057		0.058	
Male dummy	**-0.019**		**-0.020**		**-0.020**		**-0.02**		**-0.02**	
	0.030		*0.033*		*0.030*		0.03		*0.03*	
Number of observations	14,394		14,394		14,394		14,394		14,394	
Pseudo-R^2	0.036		0.030		0.036		0.036		0.037	
Minimum age	53.8		53.9		53.8		53.8		53.6	

Note: See the notes to Table 4.2 and the data appendix for description of the variables. Sources: WVS, World Development Indicators, and EBRD (2004).

4.6 Happiness through Time

As noted earlier, the WVS was first carried out in the period 1981-84, and the analysis in this paper so far has focused on the fourth wave of the survey (1999-2002). It would be of great interest to be able to compare our results for this latest wave with those based on earlier years, and indeed to carry out one large regression with both country and time dummies. This section explores this approach. Unfortunately, the sample of countries available is significantly smaller than when we focus on the fourth wave only. Furthermore, the first wave contains very few observations on the current transition countries. Hence, we focus on waves two through four in the remainder of this paper.[64]

[64] Wave 2 of the survey was carried out in the early 1990s, hence right after the beginning of the transition period. Ideally, the benchmark should be a pre-transition data, which was untenable. Hence,

Table 4.5: Life Satisfaction through Time

	Wave 2 (1990-93)	Wave 3 (1995-97)	Wave 4 (1999-2002)
Bulgaria	5.03	4.66	5.50
Belarus	5.52	4.35	4.81
Estonia	6.00	5.00	5.93
Latvia	5.70	4.90	5.27
Lithuania	6.01	4.99	5.20
Poland	6.64	6.42	6.20
Russia	5.37	4.45	4.65
Slovenia	6.29	6.46	7.23
Bosnia and Herzegovina	-	5.46	5.77
Croatia	-	6.18	6.68
Czech Republic	6.37	-	7.06
Hungary	6.03	-	5.80
Romania	5.88	-	5.23
Slovak Republic	6.15	-	6.03
Ukraine	-	3.95	4.56
Serbia	-	5.56	5.62
Montenegro	-	6.21	5.64
Albania	-	-	5.17
Azerbaijan	-	5.39	-
Armenia	-	4.32	-
Georgia	-	4.65	-
FYR Macedonia	-	-	4.56
Moldova	-	3.73	-

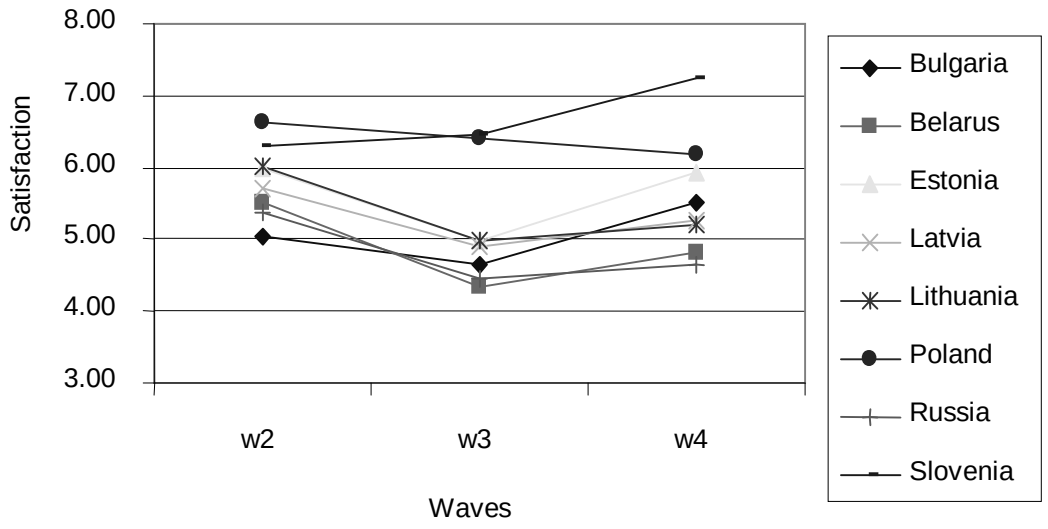
Notes: The table shows the average satisfaction score by country for each available wave of the WVS.

Source: WVS (waves 2-4).

we might be comparing the transition countries with an already lowered baseline. However, if one assumes that the pre-transition levels of happiness were higher on the average than the wave 2 results reported here, the conclusions are only strengthened with a few caveats in the cases of Bulgaria and Slovenia, whose average scores in wave 4 are higher than those in wave 2.

Table 4.5 below shows the average transition score by country for each wave for which data are available. By focusing on those countries where three waves are available, there is clear evidence of a V-shape pattern of satisfaction through time (see also Figure 4.4, where we plot the pattern for countries with three data points available). That is, most countries saw a decline in their average score between waves two and three, but a recovery between waves three and four. In two cases (Bulgaria and Slovenia), the average score in wave four is above that recorded in wave two.

Figure 4.4:
Average Satisfaction Levels over Time



Source: WVS (waves 2-4).

Table 4.6 reports the results of a multi-wave two-way fixed effects regression, using countries for which data from waves two, three and four are available. Besides the country dummies, time dummies for waves three and four (with wave two being the reference category) are also included in this regression. Interestingly, these dummies are negative and significant in both the transition and non-transition sample, as well as in the overall sample. However, the wave three dummy is more negative than wave four in the transition case, in contrast to the non-transition sample where it is less negative. This suggests that there may be some convergence in scores, with

satisfaction levels in transition countries moving closer to those in non-transition countries. Other results are largely in line with those discussed earlier (from wave four only). In particular, the positive and statistically significant coefficient on self-employment in transition holds for this multi-wave analysis, whereas it is negative and significant in the non-transition case.

Table 4.6: Satisfaction equations with two way fixed effects

	(1): Whole sample		(2): Transition countries		(3): Non-transition countries	
Wave 3 dummy	**-0.127**	***	**-0.308**	***	**-0.062**	***
	0.011		*0.023*		*0.013*	
Wave 4 dummy	**-0.096**	***	**-0.167**	***	**-0.087**	***
	0.012		*0.024*		*0.013*	
Employment status						
Part-time	**-0.024**	**	**0.049**	**	**-0.058**	***
	0.011		*0.020*		*0.013*	
Self-employed	**-0.007**		**0.049**	**	**-0.031**	***
	0.011		*0.023*		*0.012*	
Retired	**-0.051**	***	**-0.039**	*	**-0.001**	
	0.012		*0.021*		*0.016*	
Housewife	**0.051**	***	**0.021**		**0.031**	**
	0.011		*0.024*		*0.012*	
Student	**-0.002**		**0.095**	***	**-0.030**	**
	0.013		*0.028*		*0.014*	
Unemployed	**-0.247**	***	**-0.222**	***	**-0.263**	***
	0.011		*0.019*		*0.014*	
Other	**-0.081**	***	**0.017**		**-0.134**	***
	0.020		*0.038*		*0.024*	
Education						
Completed primary	**0.069**	***	**0.046**		**0.086**	***
	0.014		*0.034*		*0.015*	
Incomplete secondary (technical)	**0.151**	***	**0.111**	***	**0.185**	***
	0.014		*0.035*		*0.016*	
Completed secondary (technical)	**0.149**	***	**0.110**	***	**0.177**	***
	0.014		*0.036*		*0.015*	
Incomplete secondary (uniprep)	**0.126**	***	**0.186**	***	**0.121**	***
	0.014		*0.036*		*0.016*	

Table 4.6: Satisfaction equations with two way fixed effects

	(1): Whole sample		(2): Transition countries		(3): Non-transition countries	
Completed secondary (uniprep)	**0.148**	***	**0.123**	***	**0.163**	***
	0.014		*0.035*		*0.016*	
University w/o degree	**0.175**	***	**0.178**	***	**0.201**	***
	0.015		*0.037*		*0.016*	
University w/ degree	**0.227**	***	**0.279**	***	**0.213**	***
	0.014		*0.035*		*0.015*	
Marital status						
Live together	**-0.137**	***	**-0.175**	***	**-0.126**	***
	0.015		*0.039*		*0.017*	
Divorced	**-0.233**	***	**-0.250**	***	**-0.227**	***
	0.014		*0.022*		*0.018*	
Separated	**-0.333**	**	**-0.309**	***	**-0.343**	
	0.024		*0.050*		*0.028*	
Widowed	**-0.217**	***	**-0.196**	***	**-0.203**	***
	0.013		*0.021*		*0.018*	
Single	**-0.164**	***	**-0.114**	**	**-0.171**	***
	0.009		*0.018*		*0.010*	
Div, sep or wid	**-0.248**	**	n/a		**-0.307**	***
	0.097		*n/s*		*0.096*	
Income group						
Middle income	**0.203**	***	**0.241**	***	**0.186**	***
	0.007		*0.013*		*0.008*	
Higher income	**0.376**	***	**0.513**	***	**0.321**	***
	0.008		*0.016*		*0.009*	
Age	**-0.031**	***	**-0.039**	***	**-0.027**	***
	0.001		*0.002*		*0.001*	
Age squared (x10^3)	**0.33**	***	**0.38**	***	**0.30**	***
	0.01		*0.03*		*0.02*	
Male dummy	**-0.039**	***	**-0.003**		**-0.061**	***
	0.006		*0.011*		*0.008*	
Number of observations	140,245		41,802		98,443	
Pseudo-R^2	0.055		0.044		0.039	
Minimum age	46.9		52.2		44.3	

Notes: See Table 4.3.

Source: WVS (waves 2-4).

4.7 Conclusion

This paper is one of the first to analyse life satisfaction in a range of transition countries. The paper documents the deep dissatisfaction felt by many people in the region, even after a decade of transition. For most countries in our sample, even after a decade of transition, the average reported happiness levels are observed to be lagging behind their early 1990s levels. However, the overall picture has positive aspects too. In countries for which several time periods of evidence are available, life satisfaction appears to be rising on average, after dipping to its lowest point in the mid-1990s. Although, most countries have not caught up with their initial happiness levels, a reversal of the downward trend is detected in the data. More importantly, the level of happiness across countries is closely correlated with the progress made in transition, as well as with overall GDP per capita. Given that the region appears to be on a sustained growth path, and good progress continues to be made in transition (both trends highlighted in EBRD, 2004), life satisfaction is likely to rise further in transition countries. Thus, the answer to the question posed by this paper's title – does transition make you happy? – is a mixed one. Clearly, for many people in this region, transition has been a difficult and painful experience. But it is also clear that people are generally happier in countries that have made more progress in transition than in those where transition has lagged.

The results related to inequality are also worth emphasising. The transition countries display a strong inequality aversion, unlike in the non-transition context. It must be noted that throughout the transition process, the inequality rose dramatically from very low initial levels. This factual increase, coupled with a strong dislike for inequality, might be one of the explanatory factors as to why the people in transition countries report systematically lower average happiness levels than the predictions of a simple quadratic regression.

Finally, the analysis in this paper does not lend itself to strong policy conclusions. Nevertheless, several points are suggested by the analysis above. Two aspects are worth emphasising. First, it is important to have a renewed effort to improve the well-being of vulnerable groups. These include older people, whose skills are often irrelevant for the new challenges, and those with limited education. Second, entrepreneurship can be a rewarding strategy in transition. The paper has provided some tentative evidence that in the context of transition such people are, on average,

happier even than those with full-time jobs. This highlights the importance of creating an enabling business environment where new enterprises can be set up easily, and the provision of commercially-oriented micro-finance is further encouraged.

Appendix

Table A4.1 Description of the Data Used in the Study

Variable name	Source	Definition	Descriptive statistics-Wave 4
Life satisfaction	**World Values Survey-European Values Survey, Waves 2 to 4.**	"All things considered, how satisfied are you with your life as a whole these days?" 1 (most dissatisfied) - 10 (satisfied)	Mean= 6.43 Standard deviation=2.56
EBRD transition indicators	EBRD rating from 1 (no reform) to 4+ (standards typical of market economies). For the purposes of this paper all "-" and "+" scores were converted into decimal points by subtracting or adding 0.33 points.	EBRD Reform is the simple average of reform ratings for all the nine transition indicators: price liberalisation, trade liberalisation, small-scale privatisation, large-scale privatisation, corporate governance and enterprise reform, competition policy, banking reform and interest rate liberalisation, securities markets and non-bank financial institutions, and infrastructure. EBRD1 (Initial Phase Reforms) is an average of price liberalisation, foreign exchange and trade liberalisation and small-scale privatisation. EBRD2 is an average of the remaining six indicators. For details, see *Transition Report* 2004.	Mean=2.92 Standard deviation=.52
GDP per capita	World Development Indicators 2004	GDP per capita, PPP (current international US$)	Mean=11,744 Standard deviation=9,337
Unemployment	World Development Indicators 2004	Unemployment, total (% of total labour force)	Mean=-10.60 Standard deviation=7.35
Gini coefficient	World Development Indicators 2004	GINI index, measures inequality on a 0 (perfect equality) to 1 (perfect inequality) basis.	Mean=36.97 Standard deviation=7.72
Inflation	World Development Indicators 2004	Inflation, consumer prices (annual %)	Mean=45.96 Standard deviation=317.87

Employment status	World Values Survey-European Values Survey, Waves 2 to 4.	"Are you employed now?" Reference category: full time employment 30 hours p.w. or more.	Mean=-2.03 Standard Deviation=8.30
Marital status	World Values Survey-European Values Survey, Waves 2 to 4.	"Are you ……?" Reference category: Married	Mean=2.73 Standard deviation=2.22
Income scale	World Values Survey-European Values Survey, Waves 2 to 4.	Self-assessment between lower, middle and higher income groups. Reference category: Lower Income	Mean=1.97 Standard deviation=.81
Education	World Values Survey-European Values Survey, Waves 2 to 4.	Highest educational level attained. Reference category: Inadequately completed elementary education	Mean=4.33 Standard deviation=2.27
Age	World Values Survey-European Values Survey, Waves 2 to 4.	Demographic variable for age	Mean=41.35 Standard deviation=16.41
Male	World Values Survey-European Values Survey, Waves 2 to 4.	Dummy variable for males	Mean=.48 Standard deviation=.50
Transition	World Values Survey-European Values Survey, Waves 2 to 4.	Dummy variable for transition countries	Mean=.24 Standard deviation=.42

Table A 4.2: (All sub-samples-WVS Wave 4) with country fixed effects

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
Employment status																		
Part-time	**-0.038**	***	**-0.066**	***	**-0.013**		**0.037**		**0.067**		**0.019**		**-0.057**	***	**-0.093**	***	**-0.019**	
	0.015		*0.024*		*0.019*		*0.033*		*0.052*		*0.043*		*0.016*		*0.027*		*0.022*	
Self-employed	**-0.023**	*	**-0.030**	*	**-0.005**		**0.075**	**	**0.078**	*	**0.058**		**-0.045**	***	**-0.051**	***	**-0.030**	
	0.014		*0.017*		*0.025*		*0.035*		*0.044*		*0.062*		*0.015*		*0.018*		*0.027*	
Retired	**-0.035**	**	**-0.059**	*	**-0.018**		**-0.031**		**-0.098**	**	**0.014**		**0.025**		**-0.005**		**0.051**	
	0.016		*0.023*		*0.023*		*0.029*		*0.045*		*0.039*		*0.020*		*0.027*		*0.031*	
Housewife	**0.037**	***	**-0.103**		**0.044**	***	**0.024**		**-0.277**		**0.050**		**0.019**		**-0.067**		**0.028**	
	0.014		*0.078*		*0.017*		*0.036*		*0.189*		*0.038*		*0.016*		*0.086*		*0.019*	
Student	**-0.015**		**-0.001**		**0.006**		**0.077**	*	**0.005**		**0.139**	**	**-0.035**	*	**0.002**		**-0.021**	
	0.017		*0.024*		*0.024*		*0.040*		*0.058*		*0.054*		*0.018*		*0.027*		*0.026*	
Unemployed	**-0.264**	***	**-0.318**	***	**-0.199**	***	**-0.266**	***	**-0.311**	***	**-0.232**	***	**-0.266**	***	**-0.324**	***	**-0.184**	***
	0.015		*0.020*		*0.022*		*0.027*		*0.038*		*0.038*		*0.018*		*0.024*		*0.027*	
Other	**-0.076**	***	**-0.181**	***	**0.018**		**0.033**		**-0.097**		**0.117**		**-0.117**	***	**-0.207**	***	**-0.032**	
	0.027		*0.039*		*0.038*		*0.065*		*0.108*		*0.081*		*0.029*		*0.041*		*0.043*	
Education																		
Completed primary	**0.041**	***	**-0.013**		**0.080**	***	**0.021**		**0.008**		**0.021**		**0.061**	***	**-0.002**		**0.109**	***
	0.016		*0.024*		*0.021*		*0.041*		*0.069*		*0.051*		*0.017*		*0.026*		*0.023*	
Incomplete secondary (technical)	**0.082**	***	**0.057**	**	**0.096**	***	**0.090**	**	**0.100**		**0.073**		**0.108**	***	**0.085**	***	**0.121**	***
	0.018		*0.026*		*0.025*		*0.045*		*0.070*		*0.059*		*0.020*		*0.029*		*0.028*	
Completed secondary (technical)	**0.075**	***	**0.048**	**	**0.096**	***	**0.116**	***	**0.140**	**	**0.091**		**0.091**	***	**0.059**	**	**0.119**	***
	0.016		*0.024*		*0.023*		*0.042*		*0.068*		*0.055*		*0.018*		*0.027*		*0.025*	

Table A 4.2: (All sub-samples-WVS Wave 4) with country fixed effects

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
Incomplete secondary (uniprep)	**0.040**	**	**0.031**		**0.043**	*	**0.071**		**0.072**		**0.061**		**0.062**	***	**0.055**	*	**0.061**	**
	0.018		*0.027*		*0.025*		*0.046*		*0.075*		*0.059*		*0.020*		*0.029*		*0.027*	
Completed secondary (uniprep)	**0.100**	***	**0.051**	**	**0.136**	***	**0.157**	***	**0.129**	*	**0.167**	***	**0.094**	***	**0.053**	**	**0.127**	***
	0.016		*0.024*		*0.022*		*0.041*		*0.067*		*0.053*		*0.018*		*0.027*		*0.026*	
University w/o degree	**0.132**	***	**0.115**	***	**0.135**	***	**0.272**	***	**0.302**	***	**0.246**	***	**0.127**	***	**0.109**	***	**0.129**	***
	0.019		*0.028*		*0.026*		*0.053*		*0.084*		*0.068*		*0.020*		*0.029*		*0.029*	
University w/ degree	**0.157**	***	**0.111**	***	**0.195**	***	**0.321**	***	**0.338**	***	**0.300**	***	**0.116**	***	**0.071**	***	**0.155**	***
	0.017		*0.025*		*0.024*		*0.043*		*0.069*		*0.057*		*0.019*		*0.027*		*0.027*	
Marital status																		
Live together	**-0.082**	***	**-0.060**	*	**-0.101**	***	**-0.152**		**-0.059**		**-0.249**		**-0.082**	***	**-0.067**	*	**-0.097**	***
	0.025		*0.035*		*0.036*		*0.125*		*0.188*		*0.166*		*0.026*		*0.035*		*0.037*	
Divorced	**-0.234**	***	**-0.219**	***	**-0.235**	***	**-0.261**	***	**-0.205**	***	**-0.275**	***	**-0.216**	***	**-0.231**	***	**-0.210**	***
	0.018		*0.030*		*0.023*		*0.030*		*0.052*		*0.036*		*0.024*		*0.037*		*0.031*	
Separated	**-0.320**	***	**-0.436**	***	**-0.247**	***	**-0.274**	***	**-0.336**	***	**-0.232**	**	**-0.330**	***	**-0.453**	***	**-0.255**	***
	0.033		*0.055*		*0.042*		*0.079*		*0.129*		*0.100*		*0.037*		*0.060*		*0.046*	
Widowed	**-0.227**	***	**-0.290**	***	**-0.182**	***	**-0.200**	***	**-0.249**	***	**-0.172**	***	**-0.213**	***	**-0.286**	***	**-0.176**	***
	0.018		*0.037*		*0.022*		*0.029*		*0.061*		*0.034*		*0.023*		*0.047*		*0.028*	
Single	**-0.148**	***	**-0.149**	***	**-0.145**	***	**-0.129**	***	**-0.129**	***	**-0.120**	***	**-0.147**	***	**-0.146**	***	**-0.155**	***
	0.012		*0.017*		*0.017*		*0.026*		*0.038*		*0.036*		*0.013*		*0.018*		*0.019*	
Div, sep or wid	**-0.264**	***	**-0.356**	**	**-0.202**	*	na		na		na		**-0.316**	***	**-0.403**	**	**-0.258**	**
	0.098		*0.177*		*0.119*		*na*		*na*		*na*		*0.098*		*0.178*		*0.118*	

Table A 4.2: (All sub-samples-WVS Wave 4) with country fixed effects

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
Income group																		
Middle income	**0.199**	***	**0.183**	***	***0.208***	***	**0.191**	***	**0.159**	***	**0.213**	***	**0.199**	***	**0.188**	***	**0.205**	***
	0.009		*0.014*		*0.013*		*0.019*		*0.029*		*0.026*		*0.011*		*0.015*		*0.015*	
Higher income	**0.395**	***	**0.376**	***	**0.411**	***	**0.455**	***	**0.420**	***	**0.484**	***	**0.367**	***	**0.353**	***	**0.378**	***
	0.010		*0.015*		*0.014*		*0.021*		*0.032*		*0.029*		*0.012*		*0.017*		*0.017*	
Age	**-0.030**	***	**-0.034**	***	**-0.025**	***	**-0.040**	***	**-0.050**	***	**-0.033**	***	**-0.026**	***	**-0.030**	***	**-0.022**	***
	0.002		*0.002*		*0.002*		*0.003*		*0.005*		*0.004*		*0.002*		*0.003*		*0.003*	
Age –squared (x10^3)	**0.317**	***	**0.377**	***	**0.260**	***	**0.385**	***	**0.499**	***	**0.301**	***	**0.289**	***	**0.338**	***	**0.241**	***
	0.018		*0.026*		*0.024*		*0.036*		*0.057*		*0.047*		*0.020*		*0.029*		*0.028*	
Male dummy	**-0.058**	***	-		-		**-0.028**		-		-		**-0.077**	***	-		-	
	0.008		-		-		*0.015*		-		-		*0.010*		-		-	
Number of observations	*80677*		*39167*		*41510*		20256		9199		11057		60421		29968		30453	
Pseudo-R^2	*0.055*		*0.057*		*0.054*		0.042		0.039		0.046		0.051		0.057		0.046	
Minimum age	*46.9*		*45.8*		*48.1*		*52.2*		*50.2*		*54.4*		*44.8*		*43.8*		*45.6*	

Notes: Ordered probit regressions with heteroskedasticity-robust standard errors. This table corresponds to the table 4.2 in the main text, presenting the same material in sub-samples of males and females. Columns are ordered as follows: (1): the whole sample, (2) the whole sample restricted to males only, (3) the whole sample restricted to females, (4) the transition countries sample, (5) the transition countries sample restricted to males, (6) the transition countries sample restricted to females, (7) the non-transition countries sample, (8) the non-transition countries sample restricted to males, (9) the non-transition sample restricted to females. Reference category for the country fixed effects: Germany for 1-3 & 7-9, Russia for 4-6.

Table A 4.3: (All sub-samples of WVS Wave 4) without country fixed effects

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
Gdpcap (x10^3)	**0.038**	***	**0.038**	***	**0.038**	***	**0.089**	***	**0.084**	***	**0.094**	***	**0.029**	***	**0.030**	***	**0.027**	***
	0.005		0.004		0.005		0.013		0.011		0.014		0.005		0.005		0.005	
Unemployment	**-0.003**		**-0.003**		**-0.004**		**0.001**		**0.003**		**0.000**		**-0.003**		**-0.004**		**-0.002**	
	0.006		*0.006*		*0.007*		*0.004*		*0.004*		*0.004*		*0.006*		*0.006*		*0.006*	
Inflation (x10^3)	-0.011		0.009		-0.025		0.052	***	0.074	***	0.034	*	-3.286	***	-5.534	***	-0.979	
	0.027		0.026		0.029		0.017		0.016		0.019		1.263		1.201		1.309	
Gini coefficient	**0.018**	***	**0.020**	***	**0.017**	**	**-0.012**	**	**-0.008**	**	**-0.015**	**	**0.023**	***	**0.024**	***	**0.022**	***
	0.007		*0.006*		*0.008*		*0.005*		*0.004*		*0.006*		*0.006*		*0.007*		*0.006*	
Employment status																		
Part-time	**-0.055**	*	**-0.096**	**	**-0.022**		**0.019**		**0.045**		**0.003**		**-0.076**	*	**-0.118**	***	**-0.031**	
	0.033		*0.040*		*0.036*		*0.045*		*0.068*		*0.049*		*0.032*		*0.045*		*0.034*	
Self-employed	**0.025**		**-0.019**		**0.119**	***	**0.067**		**0.050**		**0.084**		**-0.054**	**	**-0.059**	***	**-0.014**	
	0.052		*0.048*		*0.076*		*0.044*		*0.054*		*0.055*		*0.024*		*0.019*		*0.058*	
Retired	**-0.133**	***	**-0.166**	***	**-0.105**	**	**-0.062**	**	**-0.121**	**	**-0.018**		**-0.014**	**	**-0.073**	*	**0.060**	
	0.039		*0.041*		*0.048*		*0.028*		*0.055*		*0.040*		*0.035*		*0.039*		*0.043*	
Housewife	**0.028**		**-0.190**	**	**0.055**		**0.082**		**-0.209**		**0.120**	**	**-0.075**		**-0.163**		**-0.085**	
	0.063		*0.112*		*0.066*		*0.055*		*0.146*		*0.057*		*0.064*		*0.154*		*0.057*	
Student	**0.006**		**-0.012**		**0.028**		**0.126**	***	**0.039**		**0.198**	***	**-0.050**		**-0.051**		**-0.037**	
	0.043		*0.047*		*0.047*		*0.043*		*0.072*		*0.038*		*0.037*		*0.048*		*0.042*	
Unemployed	**-0.273**	***	**-0.368**	***	**-0.162**	***	**-0.276**	***	**-0.365**	***	**-0.198**	***	**-0.287**	***	**-0.345**	***	**-0.199**	***
	0.053		*0.051*		*0.060*		*0.049*		*0.061*		*0.047*		*0.059*		*0.057*		*0.069*	
Other	**-0.049**		**-0.089**		**0.001**		**-0.042**		**-0.148**	*	**0.024**		**-0.160**	**	**-0.196**	**	**-0.115**	
	0.056		*0.063*		*0.072*		*0.091*		*0.133*		*0.093*		*0.069*		*0.079*		*0.094*	

Table A 4.3: (All sub-samples of WVS Wave 4) without country fixed effects

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Education									
Completed primary	**0.052**	**0.009**	**0.087 ***	**0.022**	**0.035**	**0.006**	**0.111 ****	**0.088**	**0.135 ****
	0.044	*0.069*	*0.047*	*0.062*	*0.094*	*0.090*	*0.054*	*0.069*	*0.057*
Incomplete secondary (technical)	**0.055**	**0.055**	**0.053**	**0.015**	**0.048**	**-0.007**	**0.167 *****	**0.171 *****	**0.172 ****
	0.065	*0.066*	*0.073*	*0.099*	*0.083*	*0.143*	*0.062*	*0.066*	*0.068*
Completed secondary (technical)	**-0.016**	**0.017**	**-0.049**	**0.081**	**0.141 ***	**0.033**	**0.101 ****	**0.104 ***	**0.109 ***
	0.071	*0.063*	*0.082*	*0.081*	*0.077*	*0.097*	*0.051*	*0.058*	*0.056*
Incomplete Secondary (uniprep)	**-0.005**	**0.024**	**-0.030**	**-0.019**	**0.007**	**-0.035**	**0.168 ****	**0.197 ****	**0.154 ****
	0.093	*0.101*	*0.092*	*0.101*	*0.104*	*0.125*	*0.073*	*0.094*	*0.065*
Complete secondary (uniprep)	**0.003**	**-0.006**	**0.009**	**0.069**	**0.059**	**0.076**	**0.102 ***	**0.115 ***	**0.102 ***
	0.066	*0.075*	*0.065*	*0.087*	*0.093*	*0.103*	*0.057*	*0.069*	*0.053*
University w/o degree	**0.135 ****	**0.154 ****	**0.122 ***	**0.238 ****	**0.258 *****	**0.230 ***	**0.182 ***	**0.202 *****	**0.175 *****
	0.061	*0.069*	*0.066*	*0.104*	*0.101*	*0.136*	*0.063*	*0.078*	*0.061*
University w/ degree	**0.054**	**0.036**	**0.076**	**0.260 *****	**0.275 *****	**0.256 ****	**0.112 ***	**0.088**	**0.152 *****
	0.062	*0.082*	*0.057*	*0.081*	*0.098*	*0.099*	*0.060*	*0.087*	*0.047*
Marital status									
Live together	**0.280 ***	**0.311 ****	**0.247**	**0.144 *****	**0.249 *****	**0.029**	**0.172**	**0.190 *****	**0.148**
	0.166	*0.157*	*0.175*	*0.053*	*0.082*	*0.127*	*0.141*	*0.129*	*0.152*
Divorced	**-0.262 *****	**-0.200 *****	**-0.282 *****	**-0.271 *****	**-0.214 *****	**-0.281 *****	**-0.119 *****	**-0.102 ***	**-0.135 *****
	0.054	*0.056*	*0.054*	*0.034*	*0.050*	*0.037*	*0.045*	*0.061*	*0.049*
Separated	**-0.215 *****	**-0.297 *****	**-0.161 ****	**-0.265 ***	**-0.284**	**-0.234**	**-0.222 ***	**-0.310 ****	**-0.175 ****
	0.061	*0.082*	*0.076*	*0.155*	*0.205*	*0.149*	*0.059*	*0.099*	*0.070*

Table A 4.3: (All sub-samples of WVS Wave 4) without country fixed effects

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)		(9)	
Widowed	**-0.237**	***	**-0.322**	***	**-0.180**	***	**-0.222**	***	**-0.318**	***	**-0.175**	***	**-0.144**	***	**-0.261**	***	**-0.111**	**
	0.044		*0.055*		*0.044*		*0.037*		*0.074*		*0.045*		*0.045*		*0.070*		*0.044*	
Single	**-0.104**	***	**-0.087**	**	**-0.109**	***	**-0.091**	***	**-0.080**	*	**-0.085**	**	**-0.139**	***	**-0.131**	***	**-0.165**	***
	0.033		*0.040*		*0.041*		*0.026*		*0.044*		*0.029*		*0.037*		*0.040*		*0.042*	
Income group																		
Middle income	**0.201**	***	**0.181**	***	**0.211**	***	**0.194**	***	**0.147**	**	**0.221**	***	**0.189**	***	**0.186**	***	**0.181**	***
	0.028		*0.030*		*0.034*		*0.053*		*0.065*		*0.054*		*0.035*		*0.035*		*0.041*	
Higher income	**0.376**	***	**0.347**	***	**0.395**	***	**0.423**	***	**0.369**	***	**0.463**	***	**0.333**	***	**0.322**	***	**0.332**	
	0.057		*0.061*		*0.056*		*0.078*		*0.086*		*0.077*		*0.075*		*0.076*		*0.076*	
Age	**-0.027**	***	**-0.033**	***	**-0.022**	***	**-0.037**	***	**-0.044**	***	**-0.032**	***	**-0.025**	***	**-0.034**	***	**-0.018**	
	0.004		*0.004*		*0.005*		*0.005*		*0.007*		*0.008*		*0.005*		*0.006*		*0.005*	
Age –squared (x10^3)	**0.294**	***	**0.374**	***	**0.225**	***	**0.346**	***	**0.427**	***	**0.283**	***	**0.306**	***	**0.415**	***	**0.216**	
	0.045		0.050		0.055		0.057		0.072		0.097		0.057		0.074		0.050	
Male dummy	**-0.041**		-		-		**-0.018**		-		-		**-0.101**	**	-		-	
	0.032		-		-		*0.030*		-		-		*0.019*		-		-	
Number of observations	47936		22801		25135		14394		6379		8015		33542		16422		17120	
Pseudo-R^2	0.034		0.035		0.034		0.036		0.032		0.040		0.03		0.04		0.03	
Minimum age	45.7		43.6		48.6		53.8		51.5		56.0		41.1		41.1		41.0	

Notes: Ordered probit regressions with robust standard errors, corrected for clustering on country. This table corresponds to the Table 4.3 in the main text, presenting the same material in sub-samples of males and females. Columns are ordered as follows: (1): the whole sample, (2) the whole sample restricted to males only, (3) the whole sample restricted to females, (4) the transition countries sample, (5) the transition countries sample restricted to males, (6) the transition countries sample restricted to females, (7) the non-transition countries sample, (8) the non-transition countries sample restricted to males, (9) the non-transition sample restricted to females.

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